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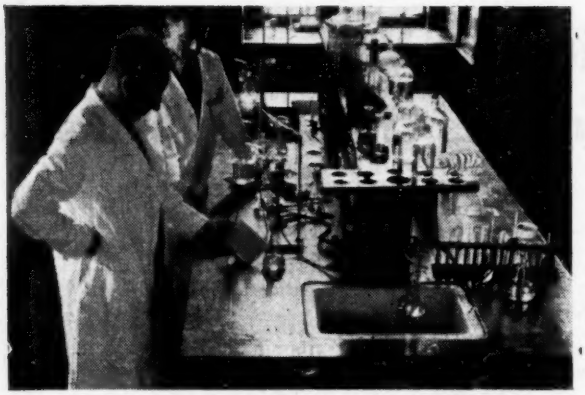

Dr. M. Stacey and Dr. F. Smith at the bench at which synthetic ascorbic acid was obtained
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1933 Synthesis of ascorbic acid by Haworth, Hirst and co-workers in Birmingham, and Reichstein, Grüssner and Oppenauer in Zürich.
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A SURGEON LOOKS AT TWO WARS *

ELLIOTT C. CUTLER, D S M, M D HARVARD, F R C S (HON.)
COLONEL M C ; CHIEF CONSULTANT IN SURGERY, UNITED STATES ARMY, EUROPEAN THEATRE OF OPERATIONS ; MOSELEY PROFESSOR OF SURGERY, HARVARD UNIVERSITY

I CAN find but few surgeons listed amongst my predecessors in this lectureship. Surgeons, indeed, have long been accorded questionable welcome amongst the intellectuals. At the same time they have received undue praise and recompense by those in need of succour. Between the seats of the learned, where they would wish to be, and the emoluments of the grateful, which often tempt them away from a scholarly life, they tread an uncertain path. And yet, through their ability to view the mysteries and the processes within the living body, they also have donated to the sum of progress. Certainly they can be counted amongst those who, as Professor Topley bravely remarked in his 1940 Linacre lecture, take sides with Paracelsus against Linacre. For the surgeons as a whole are practical realists, believe only in what they see, and scoff at authority unless it be clearly established and thoroughly supported by the strongest evidence.

Surgeons, from the barber-surgeons' day, have had available through their handicraft the greatest opportunity for progress in medical science. Each day before their eyes pass in full view the marvellous workings of the most intricate and perfect mechanism ever constructed. Unfortunately, in early times, because of a meagre education, and in later years because of the pressure of work, these advantages were but rarely capitalised.

The opportunity to observe is not enough. Firstly, the observation must be accurate ; next, there must be time for reflection and discussion; and finally, there must be more time for experimental proof. All this is a difficult matter. Our educational system deliberately opposes obstacles. Do we not put in most of our days at school at work on memorisation and little else ? After all, syntax, grammar, vocabularies (whether foreign or native), history, government, geography, and almost everything taught in primary schools except mathematics, is largely an exercise in memory. Yet memory is the least difficult of all educational processes. Parrots can be taught many languages very well ! Although some of our school time goes into mathematics, an admirable exercise and a difficult fragment of education for many, how little of it goes into the scientific methods of accurate observation, the correlation of observed data, the synthesis of ideas, the use of controls and the experimental method ! These remarks are not amiss today, for modern war is more and more the product of science, and the armies to which scientists have given the best tools for war are already on the road to victory.

Surgeons will always be found in support of any shift in education towards the scientific side, not just because they are cantankerous, desire any change and oppose authority, but because they themselves realise their shortcomings and would have been happy had they been schooled in observation and the scientific method. Linacre, the great authoritarian of his day, would not have liked this point of view ; and perhaps Erasmus, his pupil in the Greek language, would have stoned me from the hall. For Linacre was a product of a time when the best minds thought that all problems had been settled in the past and that the past needed but proper translation to make the world we see about us satisfactory. Were he alive now his intellectual superiority would have placed him high amongst the scientists of our day, with those who decry authority, explore new worlds and live for the truth as they find it.

Something of what I have just said about early education applies to my colleagues, the surgeons. Yet it might not be amiss to distribute such scientific education generally, for though I find surgeons have been rarely accorded the honour of this lectureship, all humanity would be better for more truth and less " black magic "!

* Abridged from the Linacre lecture, delivered at St. John's College, Cambridge, on May 6, 1944.

And now, in almost the busiest time in a full life, I come before you even less well prepared than would the surgeon come, labouring under such handicaps as I have spoken of, in times of peace. At the same time, no-one could be more sincere in his expressions, and the choice of title gives me an opportunity to discuss the greatest problem facing humanity today.

THE DOCTOR'S ATTITUDE

Doctors are by virtue of their education and practice internationalists ; they are taught to serve all humanity, and are less bothered by patriotism than most people. To a good doctor it matters not whether people are white, or black or yellow, so long as the individual is sick and needs care. Narrow patriotism does not concern their way of life nor their thinking. And they are not so greatly concerned with the past as with the present. And doctors at the same time see humanity as it is, know its foibles and weaknesses and can appraise it disinterestedly. They, on the whole, look on life in a kindly fashion, interested in all its goings on but rarely joining any critical group.

In modern times much that once went to the priest now goes to the doctor. Such confessions sober people, open up great avenues of tolerance and teach humility. It is against this background that we, the surgeons, see war. To one with these experiences, war seems just as silly and futile as the cliques in small towns who scarcely speak to one another because Mr. Jones obtained a divorce. Taking sides and joining in a quarrel are worse than silly under such circumstances—especially so if the Joneses confessed to Dr. X ! Indeed, if all humanity were exposed to a medical education, wars might disappear.

You must wonder ! if this be so, how I can hate my enemies, the Germans and the Japanese. Yet I hate both. It must be because in my confessional what was told me was a lie, or a deed so bad I could not forgive it and hold up my head. I was forced against my will to take sides. It is true that during long periods of postgraduate medical studies at Tübingen and Heidelberg in 1912 and 1913 I found out I did not like the Germans. I have never forgiven the Prussian officers who, during a walk with my mother when she paid me a visit, forced us to step into the street that they might pass arm in arm along a sidewalk. It was but a preview of what has been attempted many times on a grand scale against the rest of the world. And yet, in spite of that experience and similar analyses of German manners and attitudes, and in spite of my 2½ years in France in the last World War, my medical training would, I hope, make it possible for me to care for a German battle casualty today. At least it would provide an interesting experiment !

The experience this time differs in many ways from that in the last war. Responsibility for a large family alters my outlook, and a great responsibility for the care of injured American soldiers permeates my waking hours. At the same time that these added responsibilities have come upon me, greater opportunities for visualising wars have been presented, for I have been permitted a period of observation with our colossally brave Russian allies ; I have lived intimately with my British colleagues, and pass unmixed tribute to the tenacity of your people ; and I have seen American forces in North Africa and Italy.

SURGERY AND THE SURGEON

The differences in the two wars, the differences in thinking, in training, in military action, in psychological attitudes, seem to me great. But my own special field, surgical therapy, has changed but little. The wounds themselves are of about the same type and order. The bacterial flora is almost identical once the armies have reached Continental Europe. The " debridement " of a wound remains the same and is still the basis for success or failure in any given case. And the death of young men in hospitals in the forward areas still goads the young surgeon to work to the breaking-point in that frantic attempt to in some way mitigate this evil.

War is hard on the young surgeon, for a new terror confronts him. A great majority of deaths in civil hospitals are either in the very young or the elderly. The latter have had their fling at life ; Nature has already, in part, prepared them for the inevitable, and

complaints on a deathbed are rare. It is different with the robust and buoyant young soldier—all life lies immediately ahead. The anticipated pleasures, the beloved intimacies, the zest of life are in view and at hand. Bitterness may be voiced when all this fades away, such as is never forthcoming from the elderly. It is terrible to witness, and one feels absolutely futile in any attempt to cope with it. And death is not the only anguish of those who serve in our profession. It still remains pitiful to see a young man awaken from an anæsthetic, look under the blankets, and for the first time find out he has lost an extremity. If a physician or surgeon returning from the wars seems different to you, be tolerant and think what bitterness against this mess must rankle in his heart!

There have been, it is true, considerable changes in ordnance, and careful wound ballistic studies will certainly show some modifications of the havoc which attends wounding with the more varied missiles of this war, usually travelling at greater speed. But these are only minor differences, and such physical variations are in sharp contrast to the grave problem presented by the psychological reactions. These neuropsychiatrical undoings are, it is true, dependent in part upon modern ordnance; for the bombing of unprotected cities, the increasing effectiveness of mortars, mines and artillery have brought greater disaster and results on the psychological side than in effecting a difference in the wounds of the flesh. But such differences in noise are only in degree, and when we come to this problem later on I shall propose that a more fundamental reason plays the larger rôle.

It is true that there are some differences in our surgical practice in this war as opposed to the first World War. Immobilisation is better; the treatment of shock, with the desirable availability of blood and plasma in forward areas, and the addition of certain bacteriostatic agents such as the sulphonamides and penicillin, have been of assistance. It is true that the mortality-rate in United States Army hospitals is said to have dropped considerably from around 6·1% in the last war to 3·7% in this war, but these figures need careful scrutiny, for the figures for hospitalisation tend to include, even when one tries to limit the statistical data to those who are wounded, all people who filter into hospitals from the armies in the field. The enormous increase in neuropsychiatric disturbances fills a large number of the beds in army hospitals, and if the strictest tabulation is not exercised, tends to lower the percentage of mortality amongst the wounded since these latter patients do not die. We do not have, as yet, entirely accurate figures susceptible to statistical study of the percentage of wounded casualties dying in hospital. And figures from our Allies do not substantiate the hope that fewer of those reaching hospital alive become fatalities. Accurate small samples indicate that the percentage of deaths among wounded is little altered by modern means of treatment. There are data to show that the ratio of killed to wounded is increased from 1 to 3 to 1 to 2. This relates to ordnance, not to medicine and surgery, and indeed does not particularly benefit the enemy, for in many ways it is more effective to wound than to kill, since the wounded require care, the dead none. And care requires manpower.

BACTERIOSTATIC AGENTS

It is already certain that the sulphonamides and penicillin are not the "stardust" and "panacea" against infection which uncritical investigators have held out to the people. We must indeed bemoan the tendency towards publicity which today accompanies medical matters. It has both driven young doctors into too early publication of untried work, and, still more unworthy of our profession, has led less solid scientists to seek tenuous fame through the public press.

Enough experience with the sulphonamides is at hand to state that, though of great assistance against several forms of bacteria, they cannot be depended upon, either prophylactically or therapeutically, to sterilise wounds. The same attitude must prevail about penicillin, though its greater range of bacteriostatic action and its lack of toxicity make it an even more desirable adjuvant to surgical practice. And it may be said of both agents that sepsis tends to be localised when they are in evidence, thus rendering a longer period between wounding and operation safer and in some cases providing the opportunity for a less radical surgical performance.

Both agents, in a few special types of infection, continue to cure what were previously hopeless disorders—e.g., septicæmia and venereal disease. And they must be considered an almost miraculous advance in medical therapy and something for humanity to be forever grateful for. But they have little if any effect on the gram-negative bacteria, and some gram-positive strains prove resistant to them. Finally, the hope that penicillin would prove highly efficacious against the clostridial infections which cause "gas gangrene" has not been fulfilled. Young American airmen, wounded during missions over enemy territory, reaching the operating-table within 4–5 hours of injury and receiving penicillin parenterally and locally, still lose extremities from gas gangrene. One might say—without penicillin their lives would have been lost. But the ability to grow the clostridia from wounds not the seat of clinical gas gangrene in patients under penicillin therapy gives us no right for too great hope in its value in this field.

Here we see an example of the fallaciousness of transmitting laboratory data directly to man. No animal responds to infections exactly as does man, and though laboratory investigation should always precede human application the final verdict must await careful human studies and a reliable mass of human statistical data.

IMMOBILISATION OF WOUNDS

I should like to speak for a moment of immobilisation as a principle in caring for trauma. There can be little doubt but that this principle is now better recognised and more widely practised.

Not more than 25 years ago it was the best practice for surgeons to look at their wounds frequently. Dressings were pulled off healing wounds every day, and bright red and bleeding granulation tissue was spoken of as "healthy," though the very fact that it was bleeding meant that the surgeon had, at the very moment he removed the dressing, destroyed Nature's overnight attempt to heal in the wound. All the cells which had struggled to close in the wound and had become caught in the meshes of the gauze dressing were carried off by the surgeon!

Again, the increased use of plaster-of-paris has furthered the idea of immobilisation. Now it is generally recognised that wounds left undisturbed for days, and better perhaps totally immobilised in plaster-of-paris, whether an injury to a soft part or to bone, heal more rapidly than when the surgeon tinkers with them daily. And the matter of plaster-of-paris needs further comment at this time, for there has been some discussion as to who had precedence in the use of plaster casts. Some American surgeons working in the last war had intimated that they were the first to make use of them, yet an Englishman of Newcastle, Rutherford Morison, employed them in conjunction with his BIPP during that war, and the Spaniards, confronted with an absence of Thomas splints, used them freely during their recent revolution. It was not until a surgical mission visited Moscow and the Russian front in July 1943 that I learned that the great Russian surgeon, Pirogov, utilised plaster-of-paris in the Crimean War and described this in his *Principles of War-field Surgery*, published in Dresden in 1865. In this book he speaks of the great advantages of complete immobilisation, saying the plaster cast is the best preventive against the progress of traumatic swelling, and expressed surprise that the Italian and French surgeons were unacquainted with his method. Later on he states that "the best recommendation for my plaster-of-paris cast is the fact that I found it in many German clinics." And again revealing his experience was not dissimilar to our own in 1914–18: "The disadvantages and imperfections of the plaster-of-paris cast and of every cast in general are: the unseen spreading of the local asphyxia and the gangrene under the cast." And some have thought the Russians were backward and uneducated!

FORWARD SURGERY

Another practical change has been the tendency to bring surgery to the soldier. In the last war, immobilised,

underground armies without flanks pounded men to death in a stupid slogging match. Army hospitals were placed behind the combat lines out of reach of artillery fire, and became fixed. Here the soldier was brought to the surgeon. Difficulties in transport from the field held up evacuation and the time interval from wounding to surgical care cost many a life. Now, again, armies are mobile, and partly because of this, as well as for humanitarian reasons, both the British and American armies have developed small mobile units or hospitals which can go forward and carry out surgical treatment earlier. This has unquestionably resulted in the saving of many lives. Such units not only do surgery upon casualties who would not stand evacuation by ambulance, but restore through transfusion and other means many to a condition where surgery may be done. Thus, more and more, the severe wound of the abdomen or chest, the soldier with a shattered jaw, in jeopardy from obstruction to breathing, or one with internal concealed hæmorrhage in any part, is given a better chance to live. The type of casualty cared for in these forward units is best called "non-transportable" and if the sorting out of those where life or limb may be in question is well and fairly accomplished the numbers are not too numerous for these small units to handle. The opportunity to see such units in action in Italy convinced me that lives were being saved here which we lost in the last great war. The care of the most difficult cases in this group—the combined thoraco-abdominal injury—was a routine procedure in these forward areas and the mortality from abdominal injury had dropped below 20%.

This change from fixed to mobile warfare appears to have surprised our armies, whose material and transport seemed at the outbreak of the war to have been planned for another static war. And yet the last war was almost the only static war in history! Armies have always moved, and indeed mobility has been a keystone to the success of great commanders. Now that the Allies have overcome this earlier psychological disadvantage, progress towards a happy solution seems within reach.

SCIENTIST AND COMBATANT

A satisfying tendency in this war is that of greater reliance upon the physical scientist. His rôle in armament, ordnance, chemical warfare, radar and aeronautics, will not be revealed until long after the war. But that it exists is evidence of enlightment. I have even seen examples where medical scientists have benefited ordnance, armament and equipment.

Let us consider the tank. When men became unconscious in tanks in the early warfare in the desert, the heat was blamed, until the medical scientists showed that it was carbon monoxide from incomplete combustion during firing, which poured into the tank when the breach was opened for loading. When this was adjusted by proper ventilation the reason for the continued higher casualties amongst tank commanders was sought. Investigation showed the escape hatches were kept open, obviously endangering the commander who operated from this position. Further investigation revealed that the hatches were kept open not because of the heat, but because of poor visibility through the slit-like aperture provided for vision. This led to the temptation to stick one's head out and look behind and all about. The answer, better opportunity for visibility with the hatches down, suggested by scientists, diminished mortality-rates.

Again, statistical study of the woundings of airmen suggested that the offending missiles were often of low speed and might be stopped by armour. Since the weight of armouring the whole plane was prohibitive, individual armour was proposed and produced. Body armour was tried and proved beneficial. I have studied such armour bent and even pierced by missiles which, without the resistance of the armour, would unquestionably have killed airmen. Again, an advance due to medical observation and thinking.

And there are myriad other opportunities where the medical scientist could help. We have, for example, no evidence of the exact cause of death of those killed in action with ground troops, neither the location of the wounding nor the missile responsible for the injury. If we could have accurate data on 5000 fatalities in the field during the varying conditions of attack and defence, made on troops in flat country, mountainous country, on beach-head landings, in fair, in inclement weather: if we knew exactly the anatomical site of woundings and the type of missile causing each fatality, two great advantages might accrue. In the first place, localised body armour might be proven valuable. Such data might even suggest discarding the helmet, in spite of its great value as a wash-basin! And in the second place, if one piece of ordnance is doing most of the damage, we would have data directing increased production of that ordnance. It is indeed regrettable that such studies do not already exist, and is a further revelation that science, though available, is not yet fully harnessed to warfare.

PSYCHIATRIC CASUALTIES AND THEIR BACKGROUND

A chief difference in the two wars is the increase in neuropsychiatrical or exhaustion-neurosis casualties. What were formerly called "shell-shocked" or NYDN, (not yet diagnosed, neurological), casualties. The explanation is still wanting, but the alarming increase in this special category has brought the psychologist and the psychiatrist to the armies in increasing numbers.

To many, a partial explanation lies in relaxed discipline. In the last war AWOL (absent without leave), called forth the strictest disciplinary measures, and in combat most serious consequences resulted if a soldier turned tail. Now the newspapers speak of the terror of modern battle as if it had once been a different sort of game and running away would be excused now—an overall unspoken influence towards less rigid disciplinary measures.

Moreover, there are statistical data to support the fact that where there is no escape route, these psychological casualties do not arise, or arise but rarely. Thus they are not reported for crews of submarines, and surely this might be thought of as a place for psychological strain, and few on the island of Malta were afflicted once escape was found impossible. If it is quite as unsafe to run away as to stay, perhaps the unconscious processes that lead to such desertions will not arise and such casualties will diminish. This is not being hard-hearted, it is realist and practical. War is, as General Sherman called it, hell; and a soft heart does not change it one iota! Indeed, it but protracts war with resultant greater losses.

Another loophole suggests that the junior officers are not as good leaders as formerly. For men will rarely leave a good leader, which brings us back to that old saying that the British generals were the products of the playing-fields in her great schools. Possibly we now pick our officers by a different method and the system is not so good.

Another explanation lies in what has happened to humanity in our countries since the last world war. I really should only speak of my own country and will thus limit these remarks. Have we grown soft? If so, why? These are questions beyond my field. Those who have answers are scarcely the realists produced by a surgical education. But I think I can say that, following the postwar depression, Governmental aid poured out in a natural desire to help those in need. Those in need thus came to rely on others. Some self-sufficiency was lost, some intuitive independence went by the board. The idea that one's country owed one something appeared—as if one's country was something erected to look after one, not something to serve, something to be looked after. Then came the war. Training began. Meanwhile, the general standard of life had risen. The people demanded more. Military camps became more elaborate than in the last war, post-exchanges or canteens dotted the encampments, moving-picture theatres were erected, soldiers had sheets in addition to blankets. Hollywood actresses battled to entertain future heroes. It's not a pretty picture, but it is factual. After a year in such an environment, active theatres of war were opened up. Am I wrong in placing some blame upon this conditioning? After all, I am a physician and have studied Pavlov and the conditioned reflex. Anyway, the malady exists and must be faced.

Another difference in the two wars is the greater rôle of propaganda, both official and unofficial. To an American in Europe much that goes on in our newspapers is incomprehensible. The talking so greatly supersedes accomplishment! We Americans here marvel at the

silent British who never complained in their hour of trial; we who went on a mission to Russia were humble in the presence of soldiers with seven or eight wound-stripes acquired in two years of war and still eager to go back to fight again. Is all this newspaper propaganda good, or do we have to have it to carry on?

MILITARY VALUE OF HATRED

It has been said that the Russians have a more immediate stimulus than we British and Americans. It is their homes that have been burned, their wives and children that have been mishandled, starved and tortured: and their casualties unquestionably greatly outnumber our combined losses. But this stimulus may not be the only point of divergence. One of my sons wrote me that "we should take a leaf from history and notice that all really great armies have been officered (and soldiered) by the so-called fanatical few who believe heart and soul in their cause." But even above this fanaticism the Russian has that quality that makes the great soldier. He hates the guts of his enemy! One cannot stick a bayonet into a man in cold blood. Discipline alone will never do it. The "elan" of attack is above and beyond teaching, it is spiritual. How can we teach the peace-loving American and British lad to hate the Germans? He comes from a quiet farming town where there isn't much hate of any kind. No-one has hurt him or his family, he cannot quite fathom what it is all about in spite of excellent propaganda. I fear he must be hurt before his great powers of resilience, self-reliance, improvisation and natural ingenuity make him the real soldier. Our soldiers in the Pacific soon learned to hate the Japanese, whose methods make him now "good hunting" for any American lad. Our soldiers there have become realistic; like the Russian towards the "Hun," he has acquired that hatred of his enemy that makes him a good soldier.

The chaplains do not like the word hatred, and the governments want an easy way out. But must we not all admit that no decent people go to war unless all civilised means have failed to bring a solution, and that once war is begun the only object possible is victory and that preferably by the speediest method? It appears to me that war is utterly realistic and that those who fail to see this cannot wage war successfully.

OUTLOOK FOR CIVILISATION

Our nations have both found a way of life that seems worth while. Those of my generation have given much in this cause. We shall gladly give more, but both of us must be realistic as are our Russian allies. This must never happen again and every living Englishman and American must make it his personal task to see that those who make peace have been to war and know what it is. No man who has not suffered with us can make a lasting peace. We tried the other method before, the experiment failed.

Two world wars in twenty years begun by the same people cannot be just pushed aside. They must be reckoned with as a measure of our civilisation, and we should know by now how to prevent a subsequent holocaust. The experiment has been amply controlled and does not need repetition. The source of the disease is recognised. Its recurrence suggests surgical intervention of the most radical type. Medical therapy has failed. Let us hope that the consultation will be brief and held by those who have been to war and are realists even if they lack a scientific education.

We shall certainly win this war because we have that spiritual advantage that cannot be overcome. The British, not long ago, were willing even to see London destroyed if their spiritual position was eventually secured; the Greeks felt the same about Athens; the French and Italians mentioned as a major item that the destruction of Paris and Rome was almost too great a price. Yet for centuries men will pick up bits of London and Athens and marvel at her peoples. Herein lies the future of our civilisation. And when wars are done away with this may flourish beyond our dreams. But in our scientific quest and thirst we must not lose sight of man's soul. New buildings, new gadgets, new inventions of all kinds to make life easier and more pleasant can be erected or discovered easily. A spiritual loss may take centuries to recover.

THE CONSTITUTIONAL FACTOR IN ANÆSTHETIC CONVULSIONS

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EVERY conceivable factor has been held to be responsible for anæsthetic convulsions, and the extensive literature shows a host of conflicting theories and observations as to causation. In his excellent review of the subject Lundy (1937) quotes over a hundred authorities who have variously incriminated the following precipitants—toxæmia and septicæmia, excess or deficiency of CO_2, impurities in ether or in oxygen, deep or light anæsthesia, faulty methods of anæsthetisation, hypoglycæmia, atropine, alkalosis, overbreathing, disturbance of calcium metabolism, ketosis, cerebral anæmia, cerebral injury or accident, increased cerebral blood-flow, anaphylactic œdema, hydration of protein particles in the plasma, and convulsant poisons. Other writers have affirmed equally dogmatically that the fits are not caused by anoxia or excess oxygen, atropine, excess CO_2, deep ether, or an individual susceptibility to one of the agents mentioned. Hyperthermia due to inadequate heat loss has also been blamed (Wright 1933). Such a confusion makes it quite clear either that there must be multiple predisposing or precipitating causes for convulsions associated with anæsthesia, or that a single causal process, as yet unrecognised but responding to many precipitants, is responsible.

It is natural that anæsthetists, preoccupied with the prevention of the condition, should have concentrated their attention on the environmental factors which might cause convulsions, but it is remarkable that the possibility of a constitutional predisposition to epileptic fits should have been overlooked or discounted by so many observers. Mennell made a suggestion of this sort at a discussion on late ether convulsions in 1928, and Laurie referred to it 3 years later. Pask (1942) has recently carried the subject further by suggesting that, in spite of the variety of causes, the convulsions may "constitute a homogeneous group, with a specific nature and for which a specific cause should be discoverable." He asks whether the attacks are in fact anæsthetic convulsions or whether they are simply convulsions occurring while the patient is anæsthetised, concludes that predisposing conditions may exist, and observes that many of the predisposing factors also predispose to convulsions in conscious patients. A reason for the belief that anæsthetic convulsions constitute a discrete entity has been the insistence by many that the pattern of the clinical disturbance of an anæsthetic convulsion is different from that of an epileptic convulsion. Critical analysis of the published descriptions shows that this is not the case, although the anæsthetist's attention is naturally first attracted to movements of the face or to alterations in the respiration. The convulsions which occur during anæsthesia have the same characteristics as those in other toxic or infective states, or in idiopathic epileptics, although slight differences are seen from patient to patient and from time to time. Tonic-clonic fits have the same general pattern, whatever the precipitant may be.

Beecher (1939) aptly referred to the possibility of applying the electroencephalogram to the problem of anæsthetic convulsions and wrote, "What the ultimate value of studies of these new mysterious waves will be is problematical. If they are shown to be a tool with which the neurologist can prise open secrets of the central nervous system, they will undoubtedly be of service in solving some of the problems of anæsthesia." It is the purpose of this paper to report the results of electroencephalographic investigations of a series of cases of anæsthetic convulsions, and to discuss the significance of the results obtained.

MATERIAL

Of 42 cases of anæsthetic convulsions collected, 40 had had ether, the majority with nitrous oxide and oxygen; 11 were induced with ethyl chloride; 1 had had 'Pentothal' and 1 divinyl ether. Electroencephalography was carried out on 22 of the cases, and the paper

is mainly concerned with this group of subjects. Of these, 13 were males and 5 were children, 2 being fourteen years old and 3 under fourteen, the youngest ten. Only a third had had acute inflammatory disorders requiring surgical intervention; most of these disorders involved abdominal viscera, and included acute appendicitis, peritonitis and pyonephrosis. The majority were "clean" cases in a wide variety of categories, and had a normal temperature at the time of operation. Of the 22 patients examined by electroencephalography, 9 had had more than one general anæsthetic previously without a convulsion, and one had had a trouble-free general anæsthetic since. In one case there was a past history of convulsions, in one a family history of fits, and in a third a history of migraine in the patient and the patient's mother. A previous history of repeated faints, caused by postural change, a stuffy room, sight of accidents or of blood, was obtained in 6 of the 22 cases. In every instance the anæsthetic had been administered by an experienced anæsthetist, and in every one the diagnosis of anæsthetic convulsion was certain.

METHOD

The electroencephalographic investigation was carried out in all cases more than a month after the convulsion, and in most the interval ranged from 1 to 2 years. The patients were all in good health when examined, and had had no further fits since the solitary anæsthetic convulsion.

A three-channel ink-writing Grass electroencephalograph was used, and records were obtained from 8 standard positions on both sides of the head, with bipolar leads, the patient sitting comfortably with the eyes closed. The last meal had been taken about three hours previously. After routine records had been obtained, the subjects hyperventilated for 90 seconds, and records were obtained for a further two minutes afterwards. The methods employed have previously been described in detail elsewhere (Williams 1941).

ELECTROENCEPHALOGRAPHIC FINDINGS

The resting records were scrutinised by two independent observers. Agreement was close both between the two observers and between results obtained at different times by the same observer. The abnormal records were divided into those which showed:

(*a*) larval epileptic attacks;
(*b*) other paroxysmal outbursts, of a kind which have been shown to be associated with an epileptic state (Williams (1944);
(*c*) other non-specific abnormalities.

A full description of the norm in the EEG is not required here, for the criteria of abnormality employed have been discussed elsewhere (Williams 1941), and a

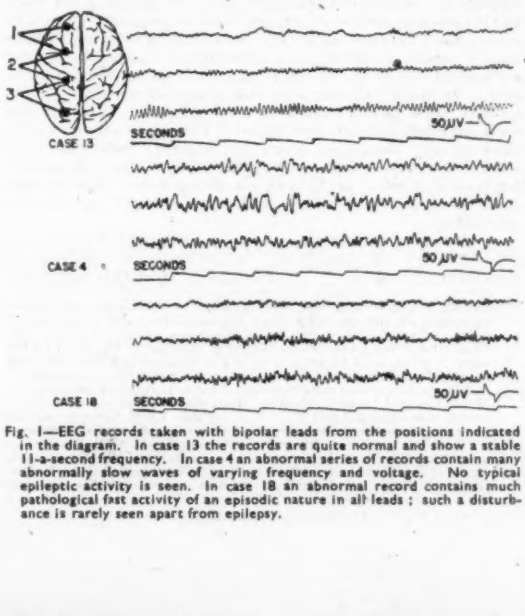

Fig. 1—EEG records taken with bipolar leads from the positions indicated in the diagram. In case 13 the records are quite normal and show a stable 11-a-second frequency. In case 4 an abnormal series of records contain many abnormally slow waves of varying frequency and voltage. No typical epileptic activity is seen. In case 18 an abnormal record contains much pathological fast activity of an episodic nature in all leads; such a disturbance is rarely seen apart from epilepsy.

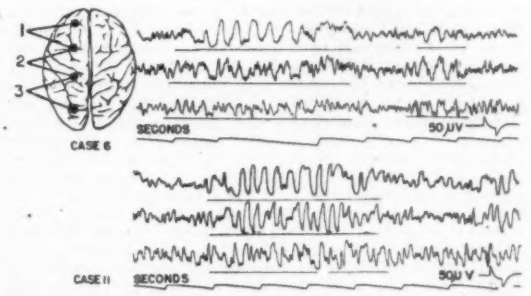

Fig. 2—Records obtained with the same technique as in fig. 1. In case 6 there are high voltage 3-a-second waves, most easily seen in the frontal and parietal regions; these represent epileptic outbursts. In Case 11 a disturbance is seen which lasts for about 4 seconds and consists of very high voltage 3- to 6-a-second waves in all leads; this disturbance represents epileptic activity.

description of larval attacks and of other paroxysmal outbursts of an epileptic kind has been given by Williams (1944), Gibbs, Gibbs and Lennox (1943), Jasper (1942). The results obtained are shown in table I.

Three of the 5 children, aged ten, thirteen and fourteen years, were considered to have abnormal records, but the difficulties of interpreting EEGs in prepubescent chi'dren are such that it might be well to exclude these. If this

TABLE I—ELECTROENCEPHALOGRAPHIC FINDINGS IN 22 CASES

Subjects	Electroencephalogram			
	Normal	Larval epileptic attacks	Other paroxysmal outbursts	Total abnormal
No. and per cent.	6 (27)	6 (27)	13 (59)	16 (73)

were done, the percentage abnormality seen in the EEG would fall to 68, but the percentage of subjects with paroxysmal outbursts would not be affected. Samples of the different kinds of records are shown in figs. 1 and 2.

CLINICAL FEATURES

A description of the phenomena observed in the convulsion was obtained from the surgeon, from the anæsthetist or from both in each of the 42 cases. It was apparent that the stereotyped features said to be distinctive of anæsthetic convulsions and to differentiate them from other kinds of convulsion were not invariably present in this group of cases. The following observations were made upon the convulsions—

(1) They did not develop during deep anæsthesia alone, and therefore did not form a contrast to "ether clonus," which is said to occur when anæsthesia is too light. One experienced anæsthetist recorded an instance in which the facial muscles twitched and became rigid, and slight cyanosis was present during induction with nitrous oxide and oxygen. When ether was added, before induction was complete, the cyanosis and facial spasm decreased, but the facial movements recommenced and the corners of the mouth retracted. After another two minutes on ether, all four limbs suddenly became involved in a severe and typical tonic-clonic seizure which stopped 20 seconds after 0·65 gramme of 'Evipan' had been given intravenously. A 70 minute operation was then carried out with the patient still under ether anæsthesia.

(2) Although anæsthetic convulsions are said to begin in the facial muscles, in 6 of the present cases there was a different onset. In one, grossly irregular respirations occurred a few seconds before a generalised seizure began. In 2 others the surgeon saw an increase in respiratory excursion, as judged by movements of abdominal viscera, for a few seconds before the onset of a generalised seizure; this was so striking that in the second case he remarked to the anæsthetist that a convulsion might be impending when he noticed an abrupt increase in the depth of respiration; hardly had he spoken when a seizure involving the face, trunk and all limbs occurred. In two instances the surgeon complained, during an abdominal operation, that the muscles were tightening, when, judged by dilated pupils and regular shallow breathing, anæsthesia was deep. In each a generalised convulsion developed shortly after. In one case observed personally the

first sign was a jerk of the muscles in the arm against which the surgeon was leaning, and this was followed by clonic movements in the face and both upper limbs. Since most of the patient is concealed it seems that observation of the face alone is responsible for the apparently mistaken impression that anæsthetic convulsions always begin in the face.

(3) Anæsthetic convulsions are said to be fatal in a high proportion of cases, but in only 1 case of our 42 were the convulsions followed by death. This was a boy aged 12 years in whom seizures began after an acutely inflamed appendix had been removed. The patient died after 25 minutes of intermittent tonic-clonic seizures, during which attempts to give intravenous evipan failed. Lundy collected 144 published cases of convulsions associated with general anæsthesia in which 30 deaths were included—a mortality of 21%. But these were scattered through 61 publications and are clearly heavily weighted with single case-reports of the more serious and spectacular type. It seems, therefore, that the mortality of anæsthetic convulsions is not greater than might be expected when any kind of convulsions supervene in an already ill patient.

(4) The possibility that overheating of the room played a rôle in any of our cases could be virtually ruled out because nearly all the operations were performed in large, well-ventilated operating-theatres at temperatures varying from 70° to 75° F. and without excessive clothing. There was also no evident tendency to a seasonal incidence of convulsions, for seizures occurred as often in the cool months, October–March, as in the warmer six months of the year.

Treatment was as follows. To 19 subjects 1–8 c.cm. of 10% evipan and to one pentothal was given, intravenously; in 6 cases the anæsthetic agent was changed to chloroform. In the remainder no specific measures were adopted, except in one patient who was mentally abnormal for several days after operation, with disorientation, confusion and constant muttering. There the mental changes may have been related to the convulsions, for a normal gall-bladder and appendix had been removed at operation. There were no sequelæ associated with the central nervous system in any of the cases.

DISCUSSION

The number of cases in which an EEG has been recorded is small, and the figures as they stand in table I have little value statistically, since assessment of the abnormal features in the EEG is of necessity arbitrary and to some extent subjective. To have value these figures should be compared with the results of strictly comparable investigations in other groups of subjects. The character of the abnormalities seen in the EEG is probably more important than the incidence of the different kinds of abnormality. Reference to other works on epilepsy (Gibbs and Gibbs 1941), Jasper 1942, Williams 1944) shows clearly that many of the paroxysmal outbursts illustrated in figs. 1 and 2 are indistinguishable from those seen in idiopathic and symptomatic epilepsy. The numbers of subjects with different types of abnormality may be compared with those obtained in a group of patients with idiopathic epilepsy, and a group of normal controls examined under identical conditions and assessed by the same standards. A detailed description of the two control groups has already been given (Williams 1944). The comparison is made in table II.

The probability that the difference between the very similar results in the abnormal groups and those in the normal group is due to chance is in each case less than 1 in 100 (P is less than 0·01 using Fisher's method for small samples). The proportions of the present small series of cases and of the large group of epileptics who show epileptic outbursts and other abnormal features in the EEG are very similar, and it has been stated already that the actual form of the abnormal paroxysmal outbursts is identical in the two groups. Furthermore, the difference between the results obtained in these two abnormal groups and the normal control group is statistically reliable. In an earlier paper (Williams 1944) it was shown that in abnormal states which give rise to epileptic attacks, paroxysmal outbursts indistinguishable from those of epileptics may be seen in the EEG before the fits commence. These abnormal states included such cerebral lesions as tumours, degenerations, injuries, infections and intoxication, but they also include

TABLE II—EEG FINDINGS COMPARED WITH THOSE IN EPILEPTICS AND NORMAL CONTROLS

Subjects	No.	Electroencephalogram (percentage of cases)			
		Normal	Total abnormal	Larval epileptic attacks	All paroxysmal outbursts
Anæsthetic convulsions	22	27	73	27	59
Idiopathic epileptics	275	25	75	27	57
Normals	241	87	12	0	0·8

states of inborn susceptibility to convulsions. It is, therefore, quite reasonable to deduce that the similarity between the EEGs of subjects of anæsthetic convulsions, and of patients with idiopathic epilepsy is explained by an identical inborn predisposition to convulsions.

Rosenbaum and Maltby (1943) have shown that if patients with puerperal toxæmia are divided into two groups—those with convulsions (eclampsia) and those without (so-called pre-eclampsia)—the group with convulsions shows a much higher incidence both of abnormalities in the EEG on recovery and of a family history of epilepsy. They therefore conclude that the fundamental difference between the two groups of toxæmic subjects lies not in a difference in the type of toxæmia but in the potency of an inborn and inherited tendency to epileptic attacks. The present results indicate that this may also be the case in patients with anæsthetic convulsions.

It may be, of course, that the high proportion of abnormal EEGs in the present series is due to secondary changes in the cerebral activity which have resulted from the anæsthetic convulsions. All the available evidence is against this, since convulsions which are caused by toxic states are not followed by permanent changes in the EEG. There is agreement among many observers that permanent changes in the EEG are not produced by a solitary fit induced by metrazol (Knott et al. 1943). Polatin, Strauss and Altmann (1940) showed that there was a return to the preconvulsive state within a few hours, and Goodwin, Kerr and Lawson (1940) found that no change attributable to the convulsion was produced until a critical and relatively large number of convulsions had been induced. When an unusually long course of treatment with metrazol convulsions has been undertaken there may be changes in the EEG, but these changes reflect the cerebral damage which has resulted, which is also apparent in the deterioration in the patient's behaviour and intellectual performance. Paroxysmal outbursts and larval epileptic attacks of the kind seen in the present series of patients do not persist. Furthermore, no evidence has ever been produced to indicate that a single artificially induced fit can cause changes of an epileptic type in the EEG of an otherwise normal subject. In many of our cases on whom electroencephalography was performed full neurological examinations were carried out at the time. The only cases which showed any deviation from the normal were those in whom operation was undertaken for a disease of the nervous system. In this small group none showed any signs or symptoms which had not been present before operation.

It therefore seems clear that an important factor in the ætiology of anæsthetic convulsions is an inborn convulsive tendency.* If it is agreed that this tendency

* Since this paper was written, another anæsthetic convulsion occurred at the Birmingham Children's Hospital in a boy of fourteen who in May, 1943, had three generalised seizures. In these there was an aura of something moving in the back of his head; he started to cry, then fell to the ground unconscious, jerking all four limbs, and there was urinary incontinence. When he recovered consciousness he complained of an occipital headache and nausea, then went to sleep. His blood Wassermann was strongly positive, and he has since been receiving antisyphilitic treatment without any specific anticonvulsant medication. At the beginning of June, 1944, he had a minor operation under ethyl chloride anæsthesia. He had been anæsthetised, was lying limply and breathing quietly before the start of the operation itself when he had a generalised seizure with clonic involvement of all four limbs lasting about 15

Continued on opposite page

is present in all idiopathic epileptics, the identity of the EEG records in the present two groups suggests that the same kind of tendency is also present in all patients who have anæsthetic convulsions.

Clinical experience shows that the idiopathic epileptic fit may have a whole host of precipitants—a high body temperature, toxæmia, a low blood-sugar, overbreathing, a low alveolar CO_2 tension, alkalosis, anoxia, hydration, menstruation, intoxication with many drugs, emotion, pain, and so on. Many of the precipitants may be highly specific, for patients have been seen who, for example, only have a fit in response to such stimuli as forceful convergence of the visual axes, hearing a particular tune, seeing blood, or experiencing such an emotion as extreme fear of anger. It will be observed that many of the precipitants of epileptic fits referred to above have also been blamed by many authors for precipitating ether convulsions. Pask (1942), after listing predisposing conditions of anæsthetic convulsions, comments that many of these are recognised as predisposing to the development of convulsions in conscious patients. A review of the literature strongly supports this observation. This fact, and the great variety of precipitants to which anæsthetic convulsions have been so confidently attributed, suggests that there is an inborn tendency to convulsions which is activated by different triggers in different subjects. The fact that the patients usually have only one fit suggests that these triggers are fairly specific. Epileptic fits are particularly likely to occur in predisposed subjects during childhood, at puberty, during infectious or toxic states, in pyrexia, in asphyxia, acapnia, alkalosis, exhaustion and hunger, and all of these factors have been described repeatedly in the subjects of anæsthetic convulsions.

Another point is that whereas chloroform, which rarely causes anæsthetic convulsions, is found to be efficacious in relieving both status epilepticus and anæsthetic convulsions, ether, with which anæsthetic convulsions are most commonly associated, produces persistent high voltage abnormally fast activity in the EEG during induction (Gibbs, Lennox and Gibbs 1937). This fast activity is recognised as being evidence of cerebral hyperexcitability, and is one of the concomitants of the epileptic state.

An intimate knowledge of the varieties of epileptic behaviour makes it clear that there are no phenomena encountered during anæsthetic convulsions which differ from the changes seen during idiopathic epileptic fits, and examination of the clinical observations in the present 42 cases shows that nothing incompatible with an ordinary epileptic fit was encountered in any instance.

From the evidence that has been put forward the hypothesis is advanced that anæsthetic convulsions are primarily due to an inborn and abnormal tendency to convulsions, the precipitant of the convulsion varying from case to case, as it does in idiopathic epilepsy. The only difference between idiopathic epileptic fits and anæsthetic convulsions appears to be the nature of the precipitants and the degree of the subject's inborn liability. Anæsthetic convulsions have very rarely been reported from epileptic institutions, and the view is generally held that they are even more rare in epileptics than in normals. The explanation for this apparent anomaly is almost certainly that the epileptic in an institution is receiving adequate anticonvulsant treatment which will inhibit any tendency to convulse during an anæsthetic.

SUMMARY

Twenty-two patients out of a series of 42 who had an anæsthetic convulsion were investigated by electroencephalography.

Abnormal EEG records were obtained from about three-quarters of these cases. Paroxysmal outbursts of abnormal waves were seen in over half, and larval epileptic attacks in a quarter.

The incidence and nature of the different abnormal discharges seen were identical with those found in a large group of idiopathic epileptics, and they did not result from the convulsion.

There was no evidence from clinical observations of the 42 cases that the anæsthetic convulsions differed in any respect from epileptic fits.

All the evidence presented supports the view that anæsthetic convulsions are primarily due to an inborn but latent epileptic liability. The factors which precipitate a convulsion in these predisposed persons vary between individuals, but many of the factors which have been incriminated are well-recognised precipitants of epileptic fits in conscious subjects.

It seems that the main difference between subjects of anæsthetic convulsions and of idiopathic epileptic fits lies in the degree of predisposition to convulsions, factors which arise during anæsthesia being merely precipitants of the convulsion.

Continued from previous page

seconds. The patient was not covered with surgical towels at the time so that the whole body was seen. The convulsions definitely did not start in the face, and the face was not severely involved. This case bears out the contention that a patient subject to convulsive seizures under other circumstances may well develop them under anæsthesia, especially when not receiving anticonvulsants.

We are grateful to the surgeons and anæsthetists of the Queen Elizabeth Hospital, Birmingham, who made their patients and case-records available to us, and to A/S/O J. K. Reynell, R.N., for technical help.

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HYALURONIDASES IN INFECTED WOUNDS

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MAJOR R.A.M.C.

McClean, Rogers and Williams (1943) and McClean and Rogers (1943) have described simple tests for the presence of hyaluronidases in the exudates and related tissues of infected wounds. These enzymes are evolved by a number of organisms, of which the most important medically are *Str. pyogenes*, *Staph. pyogenes*, the pneumococcus, and certain of the pathogenic clostridia, and so far as is known are species-specific. McClean et al. have further demonstrated that in laboratory animals hyaluronidases can be detected in the œdema fluid and tissue extracts of experimentally induced infections within a few hours of the original inoculation, and have suggested that this might form the basis of a rapid and accurate method of identifying the causal organism or organisms in naturally infected wounds. The following is an account of investigations to determine the clinical value of such tests.

Material and methods.—Supplies of potassium hyaluronate, of horse serum, and of specific antisera were kindly furnished by Dr. McClean. Only the mucin-clot prevention test was carried out, the technique employed being that described by McClean, Rogers and Williams. The material from each wound, whether exudate or muscle extract, was examined as soon as possible, usually within an hour, and always within four hours, of collection.

Results.—Twelve cases of gas gangrene were investigated in this way; the findings are set out in the table.

In addition, wound exudates, and as a rule muscle extracts, from 39 other cases were examined: these included 7 of anaerobic cellulitis, 1 of anaerobic strepto-

HYALURONIDASE TESTS IN TWELVE CASES OF GAS GANGRENE

Case	Organisms	Hyaluronidase result	Onset of gas gangrene (hours)	Prophylactic serum	
				Dose	Time (hours)
3	*Cl. welchii*	neg.	24	16,500	6
18	*Cl. welchii*	neg.	31	16,500	18
21	*Cl. œdematiens*	neg.	44	nil	nil
22	*Cl. welchii, septicum*	1/1, 1/2	20	nil	nil
23	*Cl. œdematiens*	neg.	50	nil	nil
24	*Cl. welchii*	neg.	72	16,500	50
				33,000	60
				16,500	62½
				33,000	68
25	*Cl. welchii, œdematiens*	1/1, 1/2	23	49,500	26
26	*Cl. welchii*	1/1	17	nil	nil
27	*Cl. welchii*	neg.	13	nil	nil
28	*Cl. welchii*	neg.	21	16,500	15
29	*Cl. welchii*	neg.	72	nil	nil
32	*Cl. œdematiens*	neg.	15	?	?

NOTES

1.—Case 25 was too ill for immediate operation, and received the antitoxin as part of preoperative medication. The muscle sample was recovered at operation, almost 24 hours later. In no other instance is there any substantial difference between the hour of onset of gas gangrene and the time of operation—i.e., when the muscle samples and wound exudates were obtained.
2.—The antitoxin was given intramuscularly to all except case 28 when it was given intravenously. Dosage is stated in terms of total international units of polyvalent antiserum.
3.—Times are from the hour of wounding.
4.—In all but case 24 both the wound exudate and a watery extract of the infected muscles were examined in parallel. The results were strictly comparable, except that in case 25 a partially positive reaction was obtained from the wound exudate only, and not from the muscle extract.
5.—Neutralisation tests revealed that in each positive case the hyaluronidase present was that produced by *Cl. welchii*, although in case 22 *Cl. septicum*, and in case 25 *Cl. œdematiens*, were subsequently shown by cultural methods to have been present also.
6.—The recorded dilutions of the wound exudates and muscle extracts are the original dilutions, before the other reagents required in the test had been added.

coccal myositis, 21 of simple anaerobic contamination of wounds, and 10 from wounds not infected by anaerobic organisms. The following are the crude figures of the more relevant bacteria present in the 39 cases:

Str. pyogenes	2 strains
Staph. pyogenes	13 ,,
Cl. welchii	17 ,,
Cl. œdematiens	1 strain
Anaerobic streptococci	2 strains

With one exception none of these 39 cases gave a positive reaction, although in 4 of the wounds infected with *Staph. pyogenes* there was partial destruction of the mucin clot to a dilution of 1/2. The one unequivocal positive was obtained from pus from an empyema due to *Str. pyogenes*. This gave a well-marked positive reaction to a titre of 1/128, which could be specifically neutralised by the appropriate antiserum.

Comments.—These results cannot be regarded as in any way encouraging. Every effort was made to control the individual factors involved in the tests. Various strengths of hyaluronate solution were tried, and several different batches of horse serum were used in parallel, without modifying the findings. The mucin clot produced was consistently satisfactory, and in the one positive reaction its digestion was unequivocal. In the partially positive cases there was disintegration of the clot to filamentous threads, but no complete destruction. In an investigation in the field it was not practicable to carry out extensive animal experiments. Two jerboas were, however, obtained with difficulty and inoculated, each with one strain of *Cl. welchii*, from cases 27 and 28. In both a well-marked positive reaction was obtained at the end of 12 hours, from the wound exudate and from a muscle extract, in one instance to a titre of 1/256, in the other to 1/64. In neither case had a positive reaction been obtained from the original wounds.

From these observations it seems improbable that the apparent failure of the test was due to faulty technique, and the reason for these anomalous findings must be sought elsewhere. In this respect it is noteworthy that the one positive result was obtained from the only monobacterial infection in the entire series. In all the other cases there was a very varied wound flora, with proteolytic species—*Cl. sporogenes*, *Proteus vulgaris*, and bacilli of the *subtilis* group—predominating. It is possible that the presence of these organisms may have materially affected the activity or even the existence of the hyaluronidase. And this is a problem that should readily lend itself to laboratory investigation.

However, too much significance should not be attached to a single isolated series of failures, and more extensive and more detailed inquiries into the whole subject are clearly desirable.

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DETECTION OF BACTERIAL ENZYMES IN INFECTED TISSUES

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WHEN Major MacLennan informed us privately of his failure to detect hyaluronidase in tissues from infected wounds we decided to investigate the possible causes. MacLennan's (1944) experience, reported above, was unexpected since examination of clinical material sent to us through the post by pathologists in this country had yielded encouraging results. We had been able to detect hyaluronidase in quite high titre (positive MCP test in dilutions from 1/5 to 1/160) in 4 out of 5 specimens, and in 1 case were able correctly to diagnose the infection as being due to *Cl. septicum* when the provisional clinical diagnosis was *Cl. welchii* infection.

MacLennan suggested that his failure might have been due to destruction or inhibition of the hyaluronidase by contaminating proteolytic organisms. It seemed to us, however, more likely that the routine administration of large doses of antitoxin to battle casualties might inhibit the production of hyaluronidase and lecithinase by the organisms, or might neutralise the enzymes when formed in the tissue fluids. At this time we did not know whether MacLennan's patients had received antitoxin before his tests were made, and the information given in his table was obtained from him later in view of our experimental findings.

This note records observations on the influence of antitoxin, given after infection, on the secretion of hyaluronidase and lecithinase in the tissues; it also reports the effect of employing very small doses of organisms to initiate infection, and the effect of mixed infection with proteolytic organisms on these enzymes. Some interesting observations on the synergic action of proteolytic clostridia and other wound-infecting organisms are also summarised. These observations and further experiments to determine the factors involved will be described in detail elsewhere.

METHODS

The methods used for the detection of hyaluronidase and lecithinase in œdema fluids or muscle extracts were those previously described (McClean, Rogers and Williams 1943, McClean and Rogers 1943). Unless otherwise stated, guineapigs were infected by intramuscular injection of washed 18-hour cultures together with $CaCl_2$.

RESULTS

Influence of antitoxin on detection of enzymes in infected tissue fluids.—In each experiment three groups of 4 guineapigs were infected with *Cl. welchii*. One group was given 200 units of monovalent *welchii* antitoxin 2 hours after infection, the second group received the same dose after 4 hours, and the third group was not treated. Pairs of animals in each group were killed 6 and 22 hours after infection, when the general appearance of the infection was noted and samples of œdema fluid and muscle were taken. Table I shows the results of the titration of hyaluronidase and lecithinase in these samples in four experiments. The first two experiments were with strains of poor or moderate virulence, the last two with fully virulent strains. It is unfortunate that at the time these experiments were done none of the strains were producing lecithinase in as high titre as they

TABLE I—INFLUENCE OF ANTITOXIN ON THE DETECTION OF ENZYMES IN INFECTED TISSUE FLUIDS

Hours after infection	Treatment of animals	Tissue	Hyaluronidase MCP				Lecithinase EU			
			Expt 1	2	3	4	Expt 1	2	3	4
6	Controls	Muscle	1/25	1/8–1/16	1/80	1/500	trace	0·6–0·9	0·8	3·4–3·8
		œdema	1/100	0–1/16	1/80–1/160	1/100	0	0	0·2	trace
	Antitoxin after 2 hours	Muscle	1/4	Not killed	0–1/10	1/5–1/15	0	Not killed	0·2–0·4	0
		œdema	1/3	" "	0	1/100	0	" "	0	0
	Antitoxin after 4 hours	Muscle	1/6	1/4	0–1/40	1/500	0	0·7–1·4	trace–0·4	2·0–2·4
		œdema	1/6	0	0	1/50	0	0	0	0
22	Controls	Muscle	1/300	1/8–1/256	1/640–1/1280	1/2000	trace	0·4–3·1	1·4–3·7	7·2–8·2
		œdema	1/1424	1/128–1/256	1/2560	1/3848	0	1·5–1·8	2·5–13	15
	Antitoxin after 2 hours	Muscle	1/2	0	0	1/5–1/20	0	0	0	0
		œdema	No fluid	No fluid	No fluid	1/300	No fluid	No fluid	No fluid	0
	Antitoxin after 4 hours	Muscle	0	0	0	1/30–1/1000	0	trace	0·2–0·3	0
		œdema	No fluid	0	1/40	1/2000	No fluid	..	..	0

Hyaluronidase MCP = mucin-clot prevention test. Figures indicate highest effective dilution of enzyme.
Lecithinase EU = egg units. Figures indicate units of enzyme per g. of muscle or per ml. of œdema fluid.

have before and since, but the results are nevertheless significant.

It will be seen that in the animals that had received antitoxin the appearance of enzymes, both in the muscles and œdema fluids, was usually inhibited and sometimes suppressed. In some of them the progress of infection was so much delayed by the antitoxin that no œdema fluid could be collected; in others, although the infection was obviously proceeding at a diminished rate, fluid could be collected but no active enzyme could be detected in either the muscle or œdema. Suppression of the enzymes was not due to failure of the organisms to multiply; for they could be seen in stained films, there were obvious signs of infection, and other animals given the same dose of antitoxin eventually died.

In experiment 2 the 2-hours antitoxin group were not killed at 6 hours because they showed no sign of infection and because the animals that had received antitoxin after 4 hours showed very slight infection. In experiment 4 the inhibition of hyaluronidase by antitoxin was less than in the other three experiments, but suppression of lecithinase was almost complete.

If MacLennan's table is re-examined in the light of these experiments, it will be seen that 5 cases of *Cl. welchii* or *septicum* infection had received from 16,500 to 99,000 units of antitoxin; 4 had apparently received no antitoxin, and 1 case was doubtful. Both *Cl. welchii* and *œdematiens* were isolated from one of the cases that had not received antitoxin, and if the active agent was the *œdematiens* one would not expect hyaluronidase or lecithinase to be present.* It cannot, however, be claimed that antitoxin therapy is a complete explanation of MacLennan's negative results, and this must be sought either in some technical detail connected with the collection of samples for test or in some difference between human infection and that of experimental animals. The fact that *Cl. welchii* isolated from cases 27 and 28 (one of which had received antitoxin while the other had not) both produced hyaluronidase to high titre when inoculated into jerboas indicates that the infecting organisms were capable of producing this enzyme in vivo, and our limited experience with clinical material suggests that the enzyme is produced in human tissues. The human cases from which we received specimens had not, however, received antitoxin before the infection was far advanced.

Our experimental results suggest that tests for hyaluronidase and lecithinase are likely to be negative in patients who have had an adequate dose of antitoxin before removal of the samples. This obviously limits the usefulness of the test, since it confines its possible diagnostic value to cases that have not already been given the recommended doses of antitoxin. On the other hand the presence of these enzymes in either exudate or muscle of a patient who has received antitoxin would indicate that more antitoxin is urgently required.

Influence of infecting dose of organisms on production of enzyme.—It seemed possible that the early appearance of bacterial enzymes in our experiments might be due to the large dose of organisms employed. With the dose used by us death usually occurred at between 20 and 40 hours and there is no doubt that very rapid multiplication started immediately. It is unlikely that ordinary clinical infections are initiated in this way, and failure to achieve this "flying start" might delay the detection of enzymes in the tissues. Infection experiments were accordingly set up in groups of guineapigs, using the usual infecting dose and 100-fold and 10,000-fold dilutions. Pairs of animals in each group were killed at 6, 11, 22, 30 and 80 hours, and samples of muscle and œdema were taken for examination. While it is true that with the smallest dose of organisms there was a considerable lag in the initiation of infection, and spread-out of death-times, nevertheless hyaluronidase was detectable at the earliest macroscopic sign of infection, and its titre rose steadily to figures comparable with those obtained in animals receiving the largest dose. Lecithinase was easily detectable in the animals infected by the 100-fold dilution and rose to the same titre as in animals receiving the undiluted inoculum; the titre was considerably lower in those animals infected with the smallest dose. Therefore the number of organisms introduced does not influence the production of hyaluronidase once infection is established.

Influence of proteolytic organisms on secretion of hyaluronidase and lecithinase.—To investigate MacLennan's suggestion that proteolytic organisms in the wound might inhibit the production of hyaluronidase or destroy it in the tissues, groups of animals were infected with either *Cl. welchii* or *septicum* together with *Cl. sporogenes* or *histolyticum*. Samples were collected in the usual way and examined for both hyaluronidase and lecithinase. There was no evidence of any suppression of the enzymes by the proteolytic organisms.

Synergic action of proteolytic and other organisms in mixed infections.—A striking effect was noticed when *Cl. histolyticum* was combined with either *Cl. welchii* or *septicum*. With *Cl. histolyticum* infection alone, although there is much local muscle digestion, the animals do not appear ill and do not usually die until about the 3rd or 4th day. In the combined infections the animals quickly became very ill, there was wide-spread muscle digestion and death occurred much sooner than with either organism alone.

These observations led us to set up a series of experiments in which we combined infection by *Cl. histolyticum* with infection by various strains of streptococci which were themselves harmless when injected intramuscularly in guineapigs. Both capsulated mouse-virulent and uncapsulated hyaluronidase-producing strains of streptococci were used and in some experiments the tissues were infiltrated with testicular hyaluronidase at intervals after infection in order to observe the influence of this enzyme. It will be remembered that we (1943) have already described the striking effect of streptococci and staphylococci when combined with *Cl. welchii* or *Cl. œdematiens* on the character of the resulting infection.

The general effect when infection by *Cl. histolyticum* is combined with a capsulated streptococcus, with and without the addition of hyaluronidase, is illustrated in table II. It will be seen that the streptococcus alone or

* A survey of strains of *Cl. œdematiens* has shown that whereas most type B (*gigas*) strains produce hyaluronidase in small amounts no type A strains produce this enzyme even when cultivated in medium containing hyaluronate. Lecithinase is produced only in very low titre by either type.

with added hyaluronidase produced no illness and killed no guineapigs during the period of the experiment, and deaths due to *Cl. histolyticum* alone did not start until 50 hours. When, however, the streptococcus was combined with *histolyticum*, deaths started at 24 hours and by 50 hours 10 out of 13 animals were dead. When hyaluronidase was added to the mixed infection, deaths were even more rapid and all the guineapigs were dead

TABLE II—INFECTION BY STREPTOCOCCUS AND *Cl. histolyticum* ALONE, AND BY BOTH TOGETHER WITH AND WITHOUT THE ADDITION OF TESTICULAR HYALURONIDASE

Type of infection	Hours after infection—						
	20	24	26	31	43	50	68
Streptococcus alone	0/16	0/16	0/12	0/12	0/12	0/12	0/12
Strep. + hyaluronidase..	0/16	0/16	0/12	0/12	0/12	0/12	0/12
Strep. + *Cl. histolyticum*	0/16	1/16	1/13	2/13	8/13	10/13	11/13
Strep. + *histolyticum* + hyaluronidase..	2/16	4/16	6/14	10/14	13/14	14/14	—
Cl. histolyticum alone	0/8	0/8	0/6	0/6	0/6	1/6	5/6

Note.—The numerator of the fraction indicates the number of animals dead and the denominator the total number in the group at the stated time after infection.
The total number in the group is reduced after 24 hours because animals were killed for examination at this time.

at 50 hours. The mixed infection produced extensive generalised muscle digestion and both streptococci and *histolyticum* were widely distributed in the exudate. In animals that had not received hyaluronidase the streptococci were capsulated, but in the hyaluronidase-treated group no capsules could be seen. It should also be added that when hyaluronidase is injected after *histolyticum* infection it does not alone increase the area of muscle digestion or hasten death. From our experiments to date it appears that although hyaluronidase by itself does not exacerbate infection, when it is combined with an organism which may be completely harmless alone the enzyme makes a definite contribution to the total effect.

The influence of mixed infection on the lethality of *Cl. histolyticum* may be of considerable significance in the field. MacLennan (1943) stated that in fatal cases the proteolytic clostridia tend to predominate. He reported the uniformly fatal issue of 10 cases of *histolyticum* infection, 9 of which were mixed infections.

SUMMARY

The reason for MacLennan's failure to detect hyaluronidase in wound exudates has been investigated.

Antitoxin administered after the initiation of infection inhibits or suppresses formation of hyaluronidase and lecithinase in the tissues.

Infection with very small doses of organisms does not diminish the titre of hyaluronidase in the infected tissues.

The presence of proteolytic organisms does not inhibit the production of enzymes by *Cl. welchii* or *septicum*.

The influence on the lethality of *Cl. histolyticum* of mixed infections with other organisms, some of which may be harmless by themselves, is described.

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"WHEN I came to this country a famous big gamehunter was introduced to me as the man who had recovered from blackwater fever five times. He attributed his survival to the fact that he had never been treated by a doctor. That was meant as a joke, but it contained a great truth. He told me that all he needed to cure blackwater was a supply of drinking water and a revolver. The water he used to sponge his body if fever was high and to drink in huge quantities. The revolver he said he would use to shoot anyone who dared to move him. Therein lies a great truth—REST."—J. R. GREGORY, *East Afr. med. J.* April, 1944, p. 98.

NEUROLOGICAL COMPLICATIONS OF RELAPSING FEVER

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THE campaigns in the Libyan Desert yielded cases of relapsing fever of a type not previously known in Egypt. They were due to infection with a strain of *Treponema recurrentis*, whose immunological characteristics have not yet been determined, transmitted by the bite of an unnamed argasid tick of the genus ornithodorus, bearing a close resemblance to *O. erraticus*, the vector of the Tunisian strain of treponema (Adler 1942). This tick probably inhabited the burrows of desert rodents and infection was commonly acquired in caves, slit trenches and tombs.

Characteristic of this fever was the high proportion of cases in which the central nervous system was invaded. Most descriptions of the disease include the comment that nervous sequelæ occur and that they are more common in the tick-borne than in the louse-borne fever; but their frequency and variety are not generally recognised. This paper is concerned with a small series of such cases seen in 1941 and 1942; its observations consequently apply to the disease of the north-west African coast. It is likely, however, that this reservation is not absolute: the characteristics of *Tr. recurrentis* are so labile that strains from the same locality, and even from different relapses in the same case, may show immunological variations (Ashbel 1943). Thus the clinician is probably justified in discounting the importance of differences of strain and in regarding tick-borne relapsing fever as an entity, however heretical the immunologist may consider this view.

NEUROTROPIC CHARACTER OF *Tr. recurrentis*

In the animal the neurotropism of this treponema is well established. Ashbel (1943), investigating 17 strains of *Tr. persica*, found that organisms could be isolated from the brains of guineapigs 117–398 days after apparent recovery from the infection. In some cases this cerebral invasion proved fatal and post-mortem examination showed small perivascular hæmorrhages and infiltrations with lymphocytes, monocytes and macrophages. The neurotropism of various strains has been shown to be equally great in other animals (Heronimus 1928).

This predilection of the treponema for nervous tissue in the animal raises the question whether it is similarly neurotropic in man.

Data are not plentiful; but as long ago as 1874 Ponfick reported petechial hæmorrhages in the brains of cases dying in the Berlin epidemic. Belezky and Umanskaja (1930) have recorded the findings in 8 fatal cases: clinical observations are scanty in their paper but only 1 had symptoms of disease of the nervous system. In all instances microscopy showed a patchy perivascular infiltration of the pia with monocytes, lymphocytes and plasma cells, and in places the cerebral vessels were encircled by a similar cellular halo. In 3 cases treponemata were found in the brain substance, diffusely distributed and in no constant relation to vessels.

More recently, Ungar has described the case of a woman dying in the puerperium with relapsing fever and cerebral symptoms. The post-mortem findings included a cholesteatoma of the lateral recess, œdema of the cisternal pia-arachnoid and hæmorrhages in the caudal part of the pons and the floor of the 4th ventricle. Sections showed the Virchow-Robin spaces distended with erythrocytes, lymphocytes and monocytes; treponemata were recovered from the cerebrospinal fluid and from the tumour.

Evidence of a less convincing nature is provided by Spielmeyer and Jahnel (1926) from examination of the brains of general paretics in whom therapeutics infection with *Tr. duttoni* had proved lethal. These authors describe a perivascular infiltration which differed from that seen in general paresis by virtue of the scanty plasma cells and the numerous macrophages.

These observations show that *Tr. recurrentis* has neurotropic characters in man as well as in the animal, and they furnish a morbid anatomical foundation for the varied neurological guises the disease may assume. The histological changes described are perivascular infiltrations with mononuclear cells, occurring both in the pia-

arachnoid and in the brain substance, sometimes associated with hæmorrhages. The lesions are therefore meningovascular; a fact which could have been predicted from the clinical picture, for, indeed, the disease presents parellels with meningovascular syphilis.

INCIDENCE OF NEUROLOGICAL COMPLICATIONS

The incidence of nervous complications in relapsing fever is hard to compute. Adler, Theodor and Schieber (1937) reported 45 cases of *Tr. persica* infection, in only 2 of which were nervous phenomena present: a percentile incidence of 4·5. Cooper in reviewing 63 cases infected in the Tobruk area in 1941 found 13 had meningitis and 7 facial palsy. He does not explain if any cases are included in both groups, but the minimum incidence must have been over 20%. In my series of 41 consecutive cases, 9, or 22%, are known to have had complications of this kind. Thus it appears probable that nervous sequelæ occur in about 20% of infections with the Western Desert treponema.

CASE-REPORTS

CASE 1.—A driver RASC, aged 24, fell ill on Sept. 15, 1941, with fever which lasted 3 days: *Tr. recurrentis* was found in blood films. There was a febrile relapse of 2 days' duration, starting on Sept. 29. On Oct. 14 (33rd day of the disease) he was seized with "bursting" headache, repeated vomiting and fever; the retinal veins were engorged but there was no papilloedema. Signs of focal nervous disease were lacking; there was no cervical rigidity and no Kernig's sign. Lumbar puncture yielded an opalescent fluid under a pressure of more than 300 mm. of water (see table). His headache was relieved by the lumbar puncture and after 3 days his fever and other symptoms disappeared. On Oct. 30 and Nov. 14

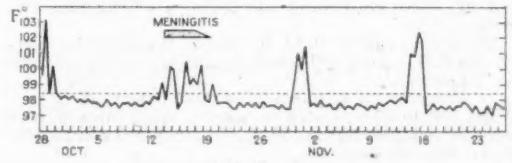

Fig. 1 (Case 1)

he had further bouts of pyrexia (fig. 1), unassociated with headache. Thereafter there was no relapse and he developed no signs of focal nervous disease.

CASE 2.—A sepoy, aged 21, was taken abruptly ill with fever and headache on April 2, 1942; *Tr. recurrentis* was found in blood films on the following day and 2 days later his temperature fell to normal. He remained well until April 14 when pyrexia recurred, accompanied by headache, nausea and vomiting; after 4 days the headache and vomiting suddenly worsened, cervical rigidity appeared and Kernig's sign became positive. Lumbar puncture gave a turbid fluid under high pressure (see table). Symptoms persisted and on April 20 lumbar puncture was repeated. Two days later headache, fever and all other symptoms vanished, and he remained well until he was transferred to another hospital 3 weeks later. No focal neurological signs appeared.

CASE 3.—A sepoy, aged 23, was taken with fever of 103·4° F. and headache on April 2, 1942. Two days later *Tr. recurrentis* was found in blood films and on April 5 his temperature became normal. On April 20 (20th day of the disease) he was restless and irritable; he complained of headache and vomiting. Cervical rigidity and Kernig's sign were present but there was no fever. Lumbar puncture gave a fluid under high pressure (see table). Symptoms slowly abated and by April 25 he felt well. On May 1 headache and vomiting recurred; the CSF was again under high pressure but was unfortunately not examined. Symptoms disappeared in 3 days and there had been no recurrence (fig. 2) when he was transferred to another hospital a fortnight later.

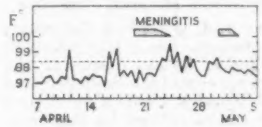

Fig. 2 (Case 3)

CASE 4.—A sepoy, aged 28, was taken with fever, starting on Feb. 14, 1942, and lasting 2 days; relapses occurred on Feb. 21 and 27; in the last bout *Tr. recurrentis* was found in

CHANGES IN THE CEREBROSPINAL FLUID IN 8 CASES OF RELAPSING FEVER WITH NEUROLOGICAL COMPLICATIONS

Case	Date	Total cells c.mm.	Neutro. (%)	Lympho. (%)	Mono. (%)	Total protein (mg./100 ml.)	Globulin	Chloride (mg./100 ml.)
1	Oct. 14	800	7	87	6	100	+ +	..
2	April 18	380	1	81	18	90	+	650
	,, 20	677	8	78	14	85	+	660
3	,, 20	1760	6	79	15	70	+	700
4	March 24	2200	12	80	8	..	−	..
	,, 27	2120	9	82	9	160	+ +	680
5	June 10	1250	16	78	6	120	+ +	680
6	Feb. 20	20	0	100	0	70	+ −	700
7	March 22	15	0	87	13	75	+	700
9	Aug. 10	1200	5	95	0	150	+ +	..
	,, 13	1140	15	85	0	160	+ +	..
	Sept. 18	226	6	94	0	100	+	..
	Nov. 5	16	0	100	0	60	−	..

blood films. He remained free from symptoms until March 24 (39th day of the disease) when his temperature rose to 101° F. and he had intense headache and vomiting. Examination revealed no abnormality except engorgement of retinal veins; there was no cervical rigidity and Kernig's sign was negative. Lumbar puncture gave a turbid fluid under high pressure (see table). Headache was relieved for some hours by the puncture but returned on the following day; 2 days later lumbar puncture was repeated. Thereafter his symptoms disappeared and his temperature fell to normal. He remained well and developed no evidence of focal damage to nervous tissue.

CASE 5.—A lance-corporal RASC, aged 25, was taken ill on June 4, 1942, with fever, occipital headache and pain in the eyes; until a week before his illness he had been sleeping in a slit trench in the desert. On June 5 he was admitted to a hospital in Tobruk; his temperature was 102·4° F. and no malarial parasites nor treponemata were seen in two blood films. He was transferred to a hospital at the base with a diagnosis of sandfly fever. On arrival on June 10 he was afebrile; his scleræ were suffused; there was cervical rigidity and Kernig's sign was positive. No malarial parasites were seen in blood films and no *Tr. recurrentis*. Lumbar puncture gave a fluid under high pressure (see table). In dark-ground preparations of the fluid *Tr. recurrentis* was found and inoculation with the fluid infected a splenectomised rat. His meningitic signs rapidly disappeared and a fortnight later he was transferred to another hospital having had no return of fever or other symptoms.

CASE 6.—A German prisoner-of-war, aged 32, was taken with a fever, which lasted 5 days, on Jan. 2, 1942. Pyrexia recurred on Jan. 13, 22 and 31; many blood films were examined without finding malarial parasites or treponemata. On Feb. 17, without rise of temperature, he developed a left facial palsy of lower-motor-neurone type. Six days later his temperature rose again and *Tr. recurrentis* was found in the blood film. Lumbar puncture gave a clear fluid under normal pressure (see table). The facial palsy lasted a fortnight and on discharge, 5 weeks later, there had been no return of fever nor any fresh symptom.

CASE 7.—A sepoy, aged 40, was taken ill on Feb. 7, 1942, with fever; there was a recurrence on Feb. 20 when *Tr. recurrentis* was found in the blood film. He remained apyrexial and without further symptoms until March 4, when he complained of weakness of the right arm. When seen for the first time on March 22 there was a hemiparesis involving the right arm and leg with increased tendon reflexes, absent right abdominal reflexes and a right Babinski's sign. Lumbar puncture yielded a clear fluid under normal pressure (see table). There was no recurrence of fever and objective signs rapidly disappeared.

CASE 8.—A lance-corporal RE, aged 26, was admitted on March 28, 1942 as a battle casualty; about a fortnight before wounding he had had a short bout of fever. On April 4 his temperature rose abruptly to 102·4° F. and *Tr. recurrentis* was found in blood films; fever lasted 2 days. He remained well until April 12 when, without further fever, he developed a left facial palsy of lower motor neurone type and a paresis of the motor parts of both fifth cranial nerves. He recovered

rapidly from the latter but, when discharged from hospital on May 26, facial palsy was still present. There had been no further fever. Lumbar puncture was not done.

CASE 9.—A private AIF, aged 24, was taken ill on June 27, 1941, with fever lasting 3 days. Relapses occurred on July 6 and 22; in the latter *Tr. recurrentis* was found in blood films for the first time. On August 6 fever recurred with headache and persisted until the 10th (fig. 3) when the headache suddenly became intense, extending down the neck, and he began

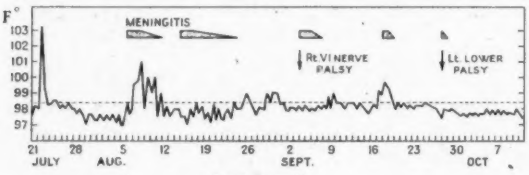

Fig. 3 (Case 9)

to vomit persistently. Cervical rigidity was present and Kernig's sign positive; there were no other abnormal physical findings. Lumbar puncture gave a fluid under high pressure (see table). The headache was temporarily relieved but lumbar puncture was again necessary 2 days later. Thereafter he improved rapidly and by August 25 was well enough to leave his bed.

On Sept. 3 he complained of diplopia and 2 days later a right abducens palsy was demonstrable; at the same time meningitic symptoms recurred for 3 days. A similar recurrence took place on Sept. 18. On Sept. 29 he noticed stiffness of the left leg and examination showed weakness, increased tendon reflexes but a negative Babinski's sign. After this episode he improved again and was transferred to another hospital on Oct. 10; a few days later a left extensor plantar reflex was obtained. By the end of November diplopia and all signs of the monoplegia had disappeared and on Jan. 16, 1942, he was invalided with occasional headache but no signs of active disease.

DISCUSSION

It is evident that neurological complications may appear at any time during the course of relapsing fever. The signs of meningitis accompanied the initial fever in case 5; but in general the onset is late rather than early. In the 7 other cases whose first day of fever is known, evidence of nervous damage appeared after a lapse of 33, 19, 17, 39, 45, 47 and 27 days. These phenomena may be unaccompanied by fever or first be manifest during a pyrexial relapse; they often show periodic recurrence.

From the clinical standpoint the neurological complications of relapsing fever fall into three groups.

The first, of which cases 1–5 are examples, is characterised by meningitis without evidence of focal damage to nervous tissue. In some (cases 1 and 4) the features are those of intracranial hypertension rather than of meningeal irritation, although the CSF shows a lymphocytic meningeal reaction. It is, perhaps, permissible to regard the process as similar to the cerebral invasion which may prove fatal in the experimentally infected animal and to draw a parallel between this condition and acute syphilitic meningitis.

The second comprises cases with signs of focal damage to nervous tissue but without clinical evidence of meningitis: it includes cases 6–8. They are comparable with meningovascular syphilis and case 7 had the hallmarks of a cerebrovascular accident. Facial palsy has been noted as a common complication (Manson-Bahr 1940); in the Tobruk cases it was observed in 11% (Cooper 1942) and it was seen twice in the present series. Into this group, also, falls the case recorded by Adler, Theodor and Schieber (1937) with bilateral papillitis.

In the third signs of meningitis are associated with those of focal nervous damage: of this combination case 9 is an example.

Cerebrospinal fluid.—The changes in the CSF in 8 cases are set out in the table. A lymphocytic pleocytosis is the characteristic finding and the total cell-count may reach 2000 per c.mm.; the figures for total protein and globulin rise pari passu with the cell count. In only one case was *Tr. recurrentis* seen in dark-ground preparations; it can often be recovered by inoculation of an animal with the fluid. The Wassermann reaction in the CSF was negative in the three cases in which it was done (4, 6 and 7); the Kahn test in the blood of all cases was negative.

Treatment.—Details of treatment have been omitted from the case-reports; but in each instance an organic arsenical was given. There was no evidence that these drugs reduced the number of relapses or the liability to invasion of the nervous system. Adler, Theodor and Schieber (1936) found that untreated cases had fewer relapses than those that received intravenous arsphenamine. Cooper (1942), while admitting that the dosage was insufficient, noted a relapse in 41 of 57 cases after arsenic had been given; in 17 *Tr. recurrentis* was again present in blood films. Arsphenamine often appears to cut short a bout of fever and it is perhaps possible that more energetic treatment was required. More recently tryparsamide and bismuth have been found effective (McAlpine 1943).

Prognosis.—It is not easy to assess prognosis in a disease of long duration under the conditions necessarily operative in military practice; so many patients are transferred to other hospitals before full recovery. None of this series died; indeed it is rare for tick-borne relapsing fever to be fatal. The majority appeared to recover completely but case 9 illustrates the frequency of repeated relapses and the chronic ill health which may result from this disorder.

SUMMARY

Neurological complications occurred in 9 of 41 cases of tick-borne relapsing fever acquired in the Western Desert. They arose at various times in the illness but were more common after the third week.

The case fell into three categories: (1) those with meningitis, (2) those with signs of focal nervous damage, and (3) those combining the features of the first two groups.

The cerebrospinal fluid showed a lymphocytic pleocytosis with a total cell-count sometimes as high as 2000 per c.mm.

Treatment with arsphenamine was ineffective.

The prognosis was hard to assess: some cases showed repeated relapses but the majority recovered completely. There were no deaths.

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MYXŒDEMA AND PSYCHOSIS

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COINCIDENCE of endocrine and psychical disorders, which seems to be not uncommon, has lately received a good deal of attention. One of us has discussed the association of pituitary disturbances and manic-depressive psychosis, and has described (Zondek 1935) a syndrome designated diencephalopathy characterised by combination of pituitary and psychotic symptoms.

The most impressive association of mental and endocrine affections, however, is encountered in hypothyroid patients; for here clear evidence of an ætiological relation may be afforded by the result of substitution therapy. So far no definite myxœdema psychosis has been established, but slowness and slackness of mental reactions, and a lack of emotional response which may amount to complete lethargy, are obvious in almost every case. Sometimes genuine psychosis of manic or depressive character, with outbreaks of rage

or fury, are observed. Other characteristic features are hallucinations of smell, and less often sight and hearing, delusions of persecution and clouding of consciousness.

In the following case a diagnosis of schizophrenia was made by a competent psychiatrist, yet the patient responded quickly to large doses of thyroid. The case may shed light on the way in which thyroid affects the mental condition.

CASE-HISTORY

Mrs. A. aged 23. Previously healthy; onset of menstruation at 13. Eighteen months ago, after a normal pregnancy, she gave birth to a healthy child. Soon after the confinement she began to gain weight and lose hair; menstruation became scanty and temporarily ceased. There was doughy swelling of the face; the skin grew dry and the voice deep. The most striking feature, however, was a complete change in her behaviour, and she was admitted to a sanatorium where true schizophrenia was diagnosed. She was treated with insulin shock and electric shock, but there was little improvement.

On admission to our department she described her state of mind as follows. "I have lost my memory, which used to be excellent. I am tortured by daydreams. Day and night I hear voices talking to me, and I am talking to them. There are machines in my body which compress my throat. I am irritated by an electric current. There is a constant humming in my ears. When people pass me in the street they curse me or make fun of me. I am tormented by bad smells. I always weep, particularly at night, because I am suffering so much. Sometimes I think all these ideas are not real, and sometimes I am convinced they are." She wrongly supposed that the police had brought her to hospital and that she was under permanent supervision by the government.

She had all the psychical characteristics of myxœdema: puffy face, swollen eyelids, rough voice, sluggish movements. Weight 66 kg.; retarded speech; dry skin; scanty hair. Heart moderately dilated to the left, soft sounds; blood-pressure 105/40 mm. Hg; pulse-rate 60; electrocardiogram typical of myxœdema; reflexes sluggish. Skin resistance 8000 ohm. Capillaries (at nail limbus) veiled in appearance; pronounced narrowing of the limbs, both being straight with no tortuous or crooked portions (see Zondek et al. 1941). Sella turcica radiographically normal. Basal metabolic rate, minus 28%. Urine average 1000 c.cm. a day, nil abnormal. Blood: red cells 3,600,000; Hb 70%; white cells 7800 (segmented neutrophil 69%, non-segmented 2%, eosinophils 4%, monocytes 3%, lymphocytes 22%). Blood sedimentation-rate (Linzenmeyer) 1 hour 45 min. Blood cholesterol 266 mg. per 100 c.cm.; blood-sugar 85 mg.; blood-urea 56 mg. Daily excretion of urea 20–27 g., of sodium chloride 4–7 g. Psychiatric diagnosis: hallucinatory, schizophrenia-like psychosis.

She was given 'Thyroidin' 0·2 g. four times a day. By the 4th day urinary excretion had risen to 2700 c.cm., despite restricted fluid intake; 1 kg. loss in weight; onset of menstruation; pulse-rate still 60. There were no changes in external appearance, but she said she had slept better: "I did not hear any more voices, but I am still tormented by bad smells and humming in the ears." On the 7th day 2700 c.cm. urine was passed. On the 10th day her weight was 63·5 kg. and by the 14th day all psychotic symptoms had disappeared. Physical improvement was evident in widening of the palpebral fissures, more lively reflexes, and clearer voice. The patient seemed cheerful and had recovered full insight into her former state of mind: "of course, my father brought me here, and nobody else." Urine about 1400 c.cm. daily; weight 62 kg.; BMR, minus 20%; blood cholesterol 160 mg. per 100 c.cm.

A year after leaving hospital the patient was still perfectly all right physically and mentally, leading a normal family life and taking full charge of her household affairs. Weight 58·5 kg.; limbus capillaries normal. She was taking thyroidin 0·2 g. daily in alternate weeks.

DISCUSSION

In this case mental recovery set in a few days after the beginning of thyroid treatment. Dehydration of the brain is the most obvious explanation of this effect, since immediately after treatment began there was a large increase in urine output and increase in sodium chloride excretion, although fluid intake was restricted. The patient lost 3·25 kg. in weight within a fortnight.

Potassium excretion could not be examined; but in another patient with myxœdema thyroidin administration was followed by an increase in sodium excretion (from about 7 g. a day before treatment to 16 g., while potassium excretion rose only from 2·4 to 3·5 g.). Boothby et al. (1925) showed that in human myxœdema a large amount of "deposit protein" is stored in the body fluids, and when thyroid is given, this extra protein is quickly oxidised and eliminated in the urine along with the extra salts and water held in combination with it. Byrom (1934) showed that diuresis following thyroid administration in myxœdema is chiefly accompanied by loss of sodium salts, whereas in normal persons potassium salts are chiefly lost, and this corresponds with our findings.

It must be assumed, therefore, that thyroid administration is followed by mobilisation of extracellular water, at least in the first stage of treatment. As early as 1918 one of us, in his first description of the myxœdema heart (Zondek 1918) showed that the effect of thyroid extract on heart muscle is largely due to dehydration. Water and salt retention may possibly also play a part in the genesis of psychical disturbances associated with pituitary affections. In cases of melancholia I found during the melancholic phases more or less complete retention of sodium chloride (Zondek 1935).

SUMMARY

A woman of 23 suffering for 18 months from myxœdema showed mental changes characteristic of schizophrenia (hallucinatory psychosis). Administration of 'Thyroidin' in large doses (0·8 g. a day) resulted in recovery from the psychosis which was noticeable on the 4th day and complete in a fortnight. At the time this mental improvement was evident, no considerable increase in the basal metabolic rate or dilatation of the capillaries (nail limbus) could be seen. The only striking physical change at that time was an increase in output of urine and of sodium chloride. It is suggested that the favourable effect was due to dehydration of the cerebral tissues.

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HYPERTENSION ASSOCIATED WITH UNILATERAL RENAL LESION

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WHEN one kidney of an animal is rendered ischæmic the blood-pressure may rise; and when this ischæmic kidney is removed the pressure may revert to normal. (Goldblatt et al. 1934, Page and Helmer 1940). It seems that pressor substances are produced in the ischæmic kidney and absorbed into the blood, and in man cases are on record in which a previously raised blood-pressure has fallen to normal after removal of a kidney damaged by such diseases as pyelonephritis, tuberculosis, and calculus (Patton et al. 1943). In the following case unilateral closed renal tuberculosis was evidently related to the patient's hypertension.

CASE-HISTORY

A woman of 18 was first seen in October, 1941, complaining of headaches. These had begun 10 months before, were chiefly frontal and temporal, and were increasingly frequent and severe. At the height of a headache she often vomited, and recently she had observed some blurring of vision. There were no urinary symptoms at any time.

She was well nourished and well developed. The apex-beat was easily visible and palpable in the 5th left interspace, 4 in. from the midline, and the second aortic sound was accentuated. The blood-pressure was 240/170 mm. Hg. Mr. C. Gimblett reported considerable swelling of the right optic disc, and several small linear hæmorrhages around it. Pressure of the arteries on the veins was noted. In the left eye the swelling of the disc was rather less, but small hæmorrhages were again seen. The urine, of clear amber colour, varied in specific gravity between 1010 and 1020, and regularly contained a little albumin, but centrifugalisation yielded no

pus, blood, casts or organisms. The blood-urea was 37 mg. per 100 c.cm.; urea-concentration (after 15 g. urea), was 0·08% in the first hour, and 1·6% in the second and third. There were no other abnormal findings. Three weeks' rest in bed somewhat relieved the headaches but the BP remained much the same.

On intravenous urography the left kidney and ureter gave a good shadow, but the right pelvis was grossly deformed and represented only by a small circular blob. On cystoscopy Mr. E. Gillespie found the left ureteric orifice normal but the right was not visible, being surrounded by œdematous polypoid tags. Neither before nor after intravenous injections of indigo-carmine was there any efflux from the area of the right ureter, whereas the efflux from the left ureter was clear before, and well coloured 4½ min. after, the injection. Urine obtained by catheter from the left ureter contained some red cells, doubtless the result of the catheterisation; on the right side the catheter would not enter the ureter.

Thus the patient had persistent and severe hypertension with secondary fundus changes, mild albuminuria, and some impairment of renal efficiency. There was also a lesion of the right kidney, but its nature was not yet clear. In view of her age and the extreme gravity of the prognosis otherwise, surgical treatment for the hypertension was considered, and it was decided to perform bilateral subdiaphragmatic lumbar sympathectomy in two stages, at the same time exploring the right kidney. Theoretically it might have seemed better to deal first with the renal lesion and observe the effect, if any, on the BP; but if lumbar sympathectomy were required later it would probably be much more difficult, on the right side, after operation on the kidney. Preliminary tests showed that under anæsthesia with 5 c.cm. of 'Evipan' BP fell from 250/160 to 180/140 mm. Hg, while with spinal anæsthesia produced by 15 c.cm. of light 'Nupercaine' it fell to 120/80.

Operation was performed by Mr. Gillespie under spinal anæthesia (nupercaine). The kidney was approached through a right lumbar incision with resection of part of the 12th rib. Its upper half was found to be separated from the lower half by a dense scar and was firmly adherent to the surrounding fat; the lower half appeared normal. The 1st and 2nd lumbar sympathetic ganglia and intervening part of the sympathetic chain, the greater and lesser splanchnic nerves and the cœliac ganglion were divided and removed. The kidney and the upper end of the ureter, which was much thickened, were then resected and the wound closed with drainage.

The resected upper half of the right kidney was found to be almost completely replaced by several closed tuberculous cavities with greyish brown walls; these were filled with caseous material containing tubercle bacilli. The pelvis was almost obliterated and did not communicate with any of the cavities. Microscopically there were the changes of cavitated caseous tuberculosis with great atrophy of the renal parenchyma. The lower half of the kidney was normal, both to the naked eye and microscopically, and no changes were observed in the vessels within its substance; in the hilum, however, the lumen of a fairly large branch of the renal artery was seen to be greatly stenosed by a thick crescent of recent-looking intimal hypertrophy, and similar changes with stenosis were noted in other small branches.

It soon became apparent that striking results had followed the operation and that it would be unnecessary to complete the second stage of the sympathectomy.

During the first 6 days, after an initial fall to 130/70 on the day after the operation, the BP rose progressively to 185/130 and the rise was accompanied by an increase in the blood-urea to a maximum of 135 mg. per 100 c.cm. Thereafter, however, the BP began to fall, and it soon settled to a fairly constant level, 145–155 systolic and 95–105 diastolic. The blood-urea also fell to normal rapidly. When the patient was discharged 25 days after operation, the BP was 155/95, the blood-urea 27 mg., and the urea-concentration test 1%, 1·6%, 2·1%. Her headaches had left her and she volunteered that her head now felt clear. The urine however still contained a little albumin, vision remained blurred especially in the right eye, and there was still slight swelling of both discs. Three months later the BP was 115/80, albuminuria had ceased, the renal function tests were normal (blood-urea 30 mg., urea-concentration 2·3%, 2·9%, 2·8%), and cystoscopy revealed no abnormality of the bladder. She had remained free from headaches, the blurring of vision had disappeared, and on ophthalmoscopy there was no trace of the previous changes. Her general health was excellent.

In the past 18 months the cure has been maintained. Successive BP readings have been 130/90, 135/90, and 135/90; her urine has remained normal; and her latest renal function tests gave a blood-urea of 25 mg. with urea-concentration 4·3%, 4·5%, 4·6%. Pyelography shows a healthy left kidney. She feels well and the only abnormality noted is that the right leg is warmer and feels the cold less acutely than the other leg—a legacy from the sympathectomy.

DISCUSSION

The question arises whether recovery was due to the removal of the diseased kidney, and what part, if any, was played by the right-sided sympathectomy. The evidence suggests, I think, that the rôle of the sympathectomy was insignificant and that the benefit must be ascribed to the nephrectomy. Judging by the results of widespread bilateral removal of sympathetic ganglia and fibres (Jefferson 1942, Takats et al. 1942) the dramatic cure here witnessed could scarcely have been the result of sympathectomy confined to one side. Nephrectomy, on the other hand, when successful, is usually strikingly so.

In conclusion I must point out that when a unilateral renal lesion is found in a patient with hypertension it does not by any means follow that the hypertension will disappear on removal of the kidney. The number of cures so far recorded is small.

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CASE OF CARDIOVASCULAR BERI-BERI

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SINCE Weiss and Wilkins (1937) first drew attention to the relative frequency of beri-beri conditions in various groups of the population in the United States of America, the disorder has been recognised more often in similar groups in Great Britain and elsewhere. Weiss and Wilkins observed that most of their cases "regularly drank large quantities of alcohol; in a smaller group, drug addiction, pregnancy, diabetes, gastrointestinal disease, psychic peculiarities (food fads) and poverty played a rôle."

Minor degrees of cardiovascular disturbance are not uncommon in the grosser forms of alcoholic peripheral neuritis, and have been generally recognised as undeveloped "wet" beri-beri. Keefer (1930) and others suggest that the reason why heart-failure is infrequent in severe polyneuritis is that the peripheral neuritis prevents muscular exertion.

In the following case the patient consumed alcohol, but was not a chronic alcoholic. He had lived on a marginal or submarginal diet for a considerable period, and was an older man than most of his fellows.

CASE-RECORD

A B., aged 45, was admitted to hospital from Cyrenaica on Jan. 24, 1944. He had been in Middle East, Persia and Malta for 2½ years, and in Cyrenaica for 7½ months. He said that 3 weeks before admission he was walking across the landing-ground when he noticed that his legs and calves were aching, that he was out of breath, and that his heart was beating rapidly. He had not previously noticed any dyspnœa. He pulled his trouser legs up and found that both legs were swollen above the ankle, and that the calves were "harder" than normal. He supposed that he had overdone it on the "tough tactics" course which had finished a week before. This course had lasted a month, during which he had not experienced any distress. He had never had any similar trouble, and he was in the habit of

playing football frequently with the unit. The swellings and dyspnœa persisted. At the end of each day, not only his legs but also his arms were swollen; in the mornings the œdema was less. He soon consulted a nearby medical officer, who noted pitting œdema over his tibiæ, carried out an exercise-tolerance test, and found that the pulse had not returned to resting level in 90 sec. The MO recommended bed for one week. During this period all œdema subsided, though on the least exertion he suffered dyspnœa and palpitations; a walk of 50 yards was all that he could manage comfortably. While in bed his calves became so tender that the pressure of the bedclothes caused him discomfort. There were no pins-and-needles or other paræsthesiæ. After the week in bed admission to hospital was advised. While waiting for the aircraft he was up and about for 5 days, and all the œdema reappeared. His air passage took 2 days, spent mostly at rest, and his œdema cleared.

Examination.—On admission he appeared a fit man for his age, alert and with no excess of fat. There was no evidence of pitting œdema, but he was unable to pull up his pyjama sleeve when the blood-pressure was taken, yet next day he could do so quite easily.

At rest the pulse-rate was 84; full bounding, and regular. Blood-vessels slightly thickened but normal for age. Fundi normal. Apex-beat diffuse; maximum impulse in the 5th space in nipple line; most distal point 5th space ½ in. outside nipple line. No thrills. Heart sounds at apex of poor quality. Rhythm not tic-tac. No murmurs. Pulmonary second sound accentuated. BP 182/100. In the chest the percussion note was impaired at bases; there were medium râles. The liver and spleen could both be felt two finger-breadths below the costal margin; neither was tender.

The cranial nerves were normal. The arms were equal in power. Biceps and triceps jerks were present and equal; supinators sluggish. There was slight weakness in knee flexion, equal (95%), and in ankle dorsiflexion, equal (90%). Plantar flexion, good power, equal. Knee-jerks ++, equal. Right ankle-jerk sluggish, left present. Superficial reflexes normal. No impairment of sensation to pin or cotton-wool. No loss of postural sense or vibration sense. Calves tender ++.

Skin, tongue and lips were normal. No pigmentation was seen. Circumcorneal injection absent on slit-lamp examination.

Nutrition.—On direct questioning, nothing relevant was found in the past history or family history. There had been no constipation. Appetite had been fair only. Weight had been lower than normal since leaving Malta 15 months previously. Including the half rations of Malta, he had been on "desert diet" for over two years. For 46 days had had no fresh food of any kind, including meat, because rains had washed away the railway line. For breakfast there was beans on toast, or occasionally egg or tinned tomato; marmalade sometimes, biscuits, margarine; rarely tinned bacon (normally in adequate supply). For lunch he had tinned meat and vegetables, or bully-beef; tinned potatoes occasionally; dehydrated vegetables. Dinner was the opposite of lunch.

Alcohol.—He said his consumption was always moderate except for the usual "party." Had one such "party" on Xmas Eve, and another on New Year's Eve. Normal intake over last six months about 5–6 tots of "something" a day; included Cyprus brandy, sherry, liqueurs, occasional local gin, or whisky. Prewar consumption 2 pints of beer a day. As a young man, he had, in Australia, taken more alcohol.

The accuracy of this account of his recent consumption of alcohol was confirmed by his unit.

Investigation.—Blood-picture normal. Kahn negative. Urine: nil abnormal. Plasma proteins 5·6 g. per 100 c.cm. Cardiac screening: heart shadow well within normal limits, but fullness of pulmonary conus, and a straight left border; no marked auricular or ventricular dilatation noted in obliques; transverse diameter 12·6 cm.; chest diameter 30 cm. Circulation-times: arm-lung, 12 sec. (normal 4–8 sec., Hitzig 1935); arm-tongue 16·5 sec. (normal upper limit 16 sec., Fishberg 1937). Electrocardiograms taken at two different hospitals, a few days after admission and a month later, showed no abnormality. T-waves, amplitude, and Q-T intervals were all within normal limits.

A vitamin-C saturation test (Harris 1940) indicated saturation on the 4th day (2 days' deficiency). Vitamin-B excretion test: resting 24-hour urines for 2 days showed levels too small for accurate estimation, less than 1·6 IU (normal 16–56 IU). Following test dose of 5 mg. thiamine subcutaneously, 24-hour output was 11 IU (normal 200 IU +). The vitamin-B_1 content of the urine was estimated by an adaptation of the method elaborated by Jansen. The vitamin in measured quantities of urine was converted into the highly fluorescent compound thiochrome by alkaline oxidation with potassium ferricyanide, and extracted with isobutyl alcohol. The intensity of fluorescence was estimated visually against standards of known B_1 content in a fluorimeter. Subtraction of the readings obtained by extraction of untreated urine with isobutyl alcohol eliminated errors due to non-specific fluorescent substances in the urine.

Treatment.—Rest. High-protein high-calorie diet. For 5 days he was given 10 mg. thiamine subcutaneously, after which injections were stopped because of shortage of soluble drug. He was then given 10 mg. thiamine per day by mouth.

Condition on leaving hospital 40 days after admission.—Felt well: no lassitude, or aching of calves; no abnormal dyspnœa on exertion or palpitations. No œdema. Able to walk 1½ miles, without distress, in half an hour. Apex-beat 5th space in nipple line, quality of heart sounds good, BP 142/94. Exercise tolerance: 76–108–76 (60 sec.). Liver palpable. Spleen not palpable. Cardiac screening: transverse diameter 11·3 cm. Arm-lung circulation-time 7 sec. Arm-tongue circulation-time 13·4 sec. Vitamin-B excretion test: resting 24 hour urine 27 IU; after 5 mg. test dose 87 IU (see table).

BEFORE AND AFTER TREATMENT

	JAN. 26	MAR. 2
Transverse diameter of heart	12·6 cm.	11·3 cm.
Circulation-times—		
Arm-lung	12 sec.	7 sec.
Arm-tongue	16·5 sec.	13·4 sec.
B_1 excretion—		
Resting	Less than 1·6 IU	27 IU *
After 5 mg. thiamin	11 IU	87 IU *

* Thiamin was withheld for 4 days before this second test.

DISCUSSION

Weiss and Wilkins noted electrocardiographic changes in 68% of their 67 patients. The commonest abnormalities were inverted T-waves and diphasic or coronary type T-waves, other changes being low-voltage QRS complexes and prolonged Q-T intervals.

Our patient showed no such changes, and it is noteworthy that in Java, where the disease is primarily dietetic, definite changes in the ECG are said to be lacking (Aalsmeer and Wenckebach 1929).

The arm-lung circulation-time in our patient was prolonged. We know of no figures for circulation-times in this disease, but Weiss and Wilkins and other writers describe an increased rate of peripheral circulatory flow, as evidenced by warm extremities, prominent arterial pulsations, pistol-shot sounds over the arteries, increased pulse-pressure and capillary pulsations. Fishberg (1937) writes "It appears that the avitaminosis, on the one hand, impairs functional capacity of the myocardium, and on the other, exerts some obscure peripheral effect which results in relaxation of the small vessels. The increased venous return, due to the diminished peripheral resistance, may in turn augment the insufficiency of the functionally impaired right heart." Weiss and Wilkins consider the term "beri-beri heart" should be discarded, and replaced by "cardiovascular beri-beri," because of the changes in the peripheral circulation which they believe play an important part in the right-sided heart-failure.

Our patient showed moist lung bases, cervical venous engorgement, bounding pulse and a high pulse-pressure on admission. Pistol-shot sounds were not heard. The circulation-times and their significance were not easy to assess. The long arm-lung time appeared compatible with the failing right side of the heart. The arm-tongue time, which was at the top limit of normal, taken with the long arm-lung time, suggested an efficient left ventricle, and even an increased arterial and arteriolar rate of flow.

Analysing the figures, subtracting arm-lung from arm-tongue time, before treatment the blood took 4·5 sec. to travel from lungs to tongue, and after treatment it took 6·4 sec. In other words, lung-tongue time was 1·9 sec. faster when the patient had beri-beri than when he had recovered. We can draw no conclusions from these figures of one case; but they could be explained by

increased rate of peripheral flow as described above. The subject was an intelligent man and a good observer, the end-points were sharp and definite.

Yudkin (1938) reports in an Indian patient a very low resting B_1 level, of the same order as in our patient. The method is not an accurate one, particularly in low dilutions, but the estimation after test-dosing may be considered reasonably reliable. Nine alcoholics with varying degrees of peripheral neuritis and several controls were subjected to the test. The controls showed normal figures, and six of the alcoholics showed deficiency after test-dosing; but none approached the deficiency exhibited by the patient A B. That he excreted only 87 IU following a test dose, after concentrated B_1 therapy for four weeks, was a surprise. It showed that vitamin therapy should be continued, though he was clinically fit.

SUMMARY

A case of cardiovascular beri-beri is described. Three ætiological factors may be recognised:

(*a*) marginal, and submarginal diet;

(*b*) some alcohol, but not chronic alcoholism; and

(*c*) possibly age.

The patient presented the usual clinical features of cardiovascular beri-beri, and showed a grossly deficient excretion of vitamin B_1. Circulation-time (arm-lung) was abnormally long.

Recovery was clinically complete in 40 days.

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Reviews of Books

Surgery of Modern Warfare

Parts IV, V, and VI. (3rd ed.) Editor: HAMILTON BAILEY, FRCS. (Livingstone. Pp. 507–716, 717–896, 897–1108. 15*s.* each part.)

PUBLICATION of three more parts completes the third edition of this useful work. These parts are mainly concerned with regional surgery of war wounds, and include excellent accounts of ways in which their special difficulties may be overcome. Most of the articles cover the whole range of treatment, from first-aid to final reconstructive surgery. Enough material has now been collected from the battle-fronts for methods to have become established, and these are well described. Much of the reconstructive surgery—for example, nerve and tendon injuries—approximates to civilian surgical practice, and the articles on these subjects are first-class. The final part deals with the administration of the various combatant and emergency medical services, and concludes with a short chapter on recent publications. The distinguished contributors have justified their selection, and the books contain information essential to anyone practising the surgery of modern warfare.

British Encyclopædia of Medical Practice

Medical Progress 1944. Cumulative Supplement 1944. Editor: Sir HUMPHRY ROLLESTON, Bt, MD CAMB., FRCP. (Butterworth. Pp. 411 and 307. 37*s.* 6*d.* the two volumes.)

"THOROUGH" has always been the apposite description of this work, and these two volumes, bringing it up to date, maintain a high standard. *Medical Progress* 1944 consists of four main sections. The first is made up of 14 critical surveys, all by recognised authorities. Outstanding among these are the late Sir Arthur Hurst's discussion of diseases of the alimentary tract, and Dr. Maurice Davidson's survey of diseases of the lungs. Sir Arthur MacNalty usefully surveys public health in the present war, though he leans towards understatement—for example, about the incidence of scabies. In the second section Professor Dilling reviews recent advances in therapeutics, and in the third important papers published up to June, 1943, are abstracted with editorial commentaries. The volume is completed by a cumulative index to all previous annual volumes. In the *Cumulative Supplement* the authors of the original volumes discuss recent advances in their subjects.

The Catholic Doctor

(3rd ed.) A. BONNAR, OFM, DD. (Burns, Oates and Washbourne. Pp. 168. 7*s.* 6*d.*)

NON-CATHOLIC readers will probably be surprised by the uncompromising firmness with which the teaching of the Church is here set forth on moral questions affecting medical practice; but there can be no hedging for the Catholic on these matters, and Dr. Bonnar is an able apologist and theologian. He frankly avows the Church's refusal to accept the hypothesis of evolution, to approve of therapeutic abortion in any circumstances whatever while the fœtus is still living, to condone any form of contraception except the use of the "safe period," or to allow Catholic medical officers in a hospital to give formal, as against material, coöperation in carrying out a sinful act (such as a sterilising operation for some non-fatal disease). The statement of these principles and their application clarifies a situation often misunderstood, even by Catholics. It is as well, too, that an informed pronouncement should be made about psychological treatment: Dr. Bonnar affirms roundly that the outlook of all true Freudians and of many other psychologists is radically wrong and that Catholics who require psychological treatment should be treated by a Catholic psychologist. On these and the many other controversial matters he shows polemical as well as expository skill, and hits out vigorously at those who deny the moral principles of the Church or the correctness of their application to medical issues.

Clinical Practice in Infectious Diseases

(2nd ed.) E. H. R. HARRIES, M. MITMAN. (Livingstone. Pp. 570. 22*s.* 6*d.*)

DESPITE the happy reception of the first edition, with its appeal to senior readers, Dr. Harries and Dr. Mitman have avoided a temptation to produce an unwieldy textbook on fevers. Some expansion—about 100 pages—was inevitable both to record the considerable published work of the war years and to overcome the minor defect of over-condensation in some chapters of the first edition. This has been partly achieved by including a lucid separate section on chemotherapy, which deserves close scrutiny in view of the growing importance of these drugs in management of the infectious diseases. The administrative problems at the end of the book have been regrouped, and a synopsis has been introduced at the beginning of each chapter. The many tables of the first edition have been cut down, but all the really helpful ones have been retained. A list of references has been included at the end of each chapter.

Alarming Heart Attacks—Serious and Innocent

H. O. GUNEWARDENE, MB LOND., DMRE. (Ceylon Daily News Press. Pp. 61.)

THE alarming attacks which Dr. Gunewardene deals with in this booklet are acute œdema of the lungs, coronary thrombosis, attacks of tachycardia, and what he describes as cardiovascular autonomic dystonia. Based largely on his own experience in Ceylon, the book adds little to our knowledge but presents relevant data in a fresh and arresting way.

Follikelhormonapplikation und Hormonale Tumorentstehung (Tierversuche)

HUBERT VON WATTENWYL, Privatdozent, Oberarzt am Frauenspital, Basel. (Schwabe. Pp. 235. 24 sw. fr.)

THIS book presents a full summary of published work throughout the world on the effect of the œstrogenic hormones on experimental tumours in animals. The summary is good, the illustrations plentiful, and the references valuable.

Lichtwitz's *Pathology and Therapy of Rheumatic Fever*, which was reviewed in our columns last April (*Lancet*, 1944, i, 436), has now been published in this country by Heinemann (Medical Books). The English price is 21*s.*

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THE LANCET

LONDON: SATURDAY, SEPTEMBER 30, 1944

Arterial Trauma and the Sympathetic

INJURIES which interfere with the blood-flow of the limb, whether by rupture of the main vessels with hæmatoma formation, partial rupture with thrombosis, or arterial spasm, are often seen these days, and opinions still differ on the part played by the sympathetic nervous system in the failure of circulation. Many urge that where the life of the limb is threatened by anæmia it is essential to secure functional release of the sympathetic; others think this principle is based on false premises. COHEN [1] pointed out that surgical ligature of a main vessel in a healthy young adult is rarely followed by gangrene. SENCERT [2] ligated 70 main vessels and gangrene developed in 2 cases only. The collateral vessels primarily intended for carrying on the circulation when a main vessel is temporarily obstructed—for example, by acute flexion of a joint—are usually capable of maintaining an adequate blood-supply to the parts beyond the ligature, though it may take some days before such compensation is sufficient for the normal functions of the limb. In fractures and gunshot wounds, on the other hand, gangrene or a lesser grade of ischæmia leading to muscle contracture or intermittent claudication is an unfortunately common complication. Why the difference? LERICHE [3] held that damage to the artery initiates a sympathetic reflex which puts the limb vessels, especially the collaterals, into spasm, and he advocated excision of the damaged segment. GRIFFITHS [4] supported this view. That spasm of an artery does occur after an injury is undoubted, but COHEN maintains that this is a direct response of the vessel to injury, and is not dependent on a reflex arc. He regards the local arterial bruise "not as an irritable focus, but as visible evidence that the vessel has sustained a severe blow." There is also reasonable doubt whether the collaterals do in fact go into spasm as a result of injury to the main vessels. Anatomists and physiologists have been unable to demonstrate such a mechanism, and will not admit a receptor sympathetic system in the vessels. It therefore seems doubtful whether excision of a segment of a damaged artery is the essential factor in the release of spasm. Although arterectomy or functional release of the sympathetic, whether by local block, spinal anæsthesia or resection, may in some cases bring back the distal pulse, this is by no means certain, nor does the pulse return in many successful cases for hours or even days afterwards. It is an unusual sort of reflex which goes on acting for hours after the removal of some component of its arc. In any event the path of such a reflex arc is purely speculative; and LEWIS [5] maintains that arterectomy with a view to breaking reflex vasoconstriction of the collaterals is an operation which has no physiological sanction. According to COHEN, it is not spasm of collaterals but the direct injury they sustained when the main artery was damaged which causes the ischæmic symptoms in the distal limb.

No-one suggests that excision of a damaged segment of artery should be abandoned, for this will remove a focus from which thrombosis may extend, occluding branches which are important for establishing the collateral circulation. But it is suggested that an attack on a more central part of the sympathetic nervous system, as by lumbar or cervicodorsal sympathectomy, is not only unlikely to relieve the ischæmia but may even do harm. A limb whose main vessel is obstructed is white and cold. This may well be a physiological response intended to divert blood from the skin, which can live 24–48 hours without nourishment, to muscle which can withstand no more than 6–8 hours ischæmia; if so, it is wrong to interfere with the diversion. And it should be remembered, as BARCROFT and others [6] have shown in their work on posthæmorrhagic fainting, that the cold white limb may have a deep circulation full of blood. BARCROFT and his colleagues [7] have demonstrated beyond question that there is some sympathetic vasoconstrictor supply to the muscles, but the rise in blood-flow through a muscle produced by complete sympathetic release is only about $\frac{1}{15}$th of that produced by muscle metabolites, which are the main factors in causing muscular vasodilatation. In an anæmic limb these substances are not washed away and will collect in excess, thereby attracting as much blood as is available, at the expense of the skin and subcutaneous vessels, which become white and cold. Here again a sympathectomy, by diverting blood to the skin and subcutaneous tissues, might well aggravate the condition of the muscle already suffering from a local excess of its own products of metabolism. In the management of the anæmic limb, attempts to warm a cold limb have given place to cooling it further. BARCROFT and EDHOLM [8] have shown that at 30° C., the physiological blood-flow—the amount of blood demanded by a muscle under normal circumstances of circulation—is four times, and at 40° C. eighteen times, that at 25° C. Why therefore try to raise the temperature of the limb by sympathetic release, more especially if the appearance of warmth is due mainly to hyperæmia of the skin and subcutaneous tissues? BLACKWOOD,[9] in discussing the significance of this sharing or rationing of the local blood-supply, urges that infection, like sympathectomy, by causing local vasodilatation will draw unto itself more blood, thus depriving other areas of their share, and sometimes precipitating ischæmic effects.

Those are the arguments against sympathectomy or sympathetic block in the treatment of limb ischæmia. They are by no means generally accepted. In this war many limb-saving measures have been adopted—keeping the limb cool, rest, control of infection, rapid attention to resuscitation, intravenous hypertonic saline and the like—and many patients have been given sympathetic block injections at the same time. It has been difficult fairly to apportion the successes achieved, and sympathetic block still has powerful advocacy. Moreover, even if we accept these arguments, sympathectomy will retain a place in the

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9. Blackwood, W. *Edinb. med. J.* 1944, **51**, 131.

traumatic surgery of main vessels. When excision or ligature of a main vessel is contemplated, as in the treatment of a popliteal aneurysm, where there is a grave risk of gangrene, a sympathetic release a fortnight or so beforehand will dilate the superficial vessels while there is still sufficient blood passing through the main vessel, providing a preformed bypass for the blood-stream through the superficial tissues. LEARMONTH and RICHARDS,[10] from a close study of skin temperatures before and after a popliteal aneurysm operation, strongly advise sympathectomy as a preliminary to all these operations. Here sympathectomy is preparing in a time of abundance for lean days to come; in the acute injury its opponents would call it robbing Peter to pay Paul. But the collateral circulation, if it is to meet the full needs of the recovering limb, has to develop and enlarge by active growth. Capillaries have to become arterioles and venules; gaps of blown and lacerated tissues have to be bridged and repaired; the woody fibrous mass surrounding the hæmatoma of the aneurysm has to be absorbed. Such repair takes time and must be allowed for in planning operations on traumatic aneurysms. When the collateral circulation is established there is much to be said for deliberate preliminary dilatation of the collateral vessels by sympathectomy. This plan for dealing with vascular injuries has been followed in the Middle East,[11] and, backed by the other modern methods of caring for the ischæmic limb, has been giving excellent results.

Anæsthetic Convulsions and Epilepsy

FOR many years there have been two schools of thought regarding epilepsy—one emphasises what is common to many different convulsive states and the other emphasises their differences. Members of the former school see the various lesions which may give rise to epilepsy almost as accidental precipitating factors, while to their opponents the lesion is of primary importance and the epilepsy merely a symptom. To emphasise the heterogeneity of epilepsy the second school often spoke of "the epilepsies" and looked on idiopathic epilepsy not as a name of a nosological entity but merely as a term to cover our ignorance of the cause of the attacks in a residuum of cases. For this residuum they found the name "cryptogenic epilepsy" more acceptable. Electro-encephalography has provided evidence supporting the unitary view—more ample and fundamental evidence, that is, in favour of a theory towards which clinical observation already pointed. The inheritance of epilepsy independently of any discoverable causal lesion suggests that we must distinguish between such lesions and some as yet unknown underlying state. Moreover there is evidence that such lesions (or other states often regarded as in themselves adequate to cause convulsions) might act merely as triggers to an inherited predisposition. Thus PATRICK and LEVY[12] found that infantile convulsions were five times as common among epileptics as among children who grew up to be normal, and observed also that among non-epileptic children who had infantile convulsions a family history of both early convulsions and epilepsy was much commoner than in normals. BRAIN,[13] in a study of the inheritance of epilepsy, observed that early convulsions were nearly twice as common in epileptics with a family history of the disease as in those without it. Epilepsy may develop in patients with head injury, neurosyphilis or infantile hemiplegia, who also have a family history of the disease; and he suggested that in these cases the acquired lesion precipitated the convulsions by activating an inherited predisposition.

But the nature of the inherited predisposition remained obscure and its existence could never be demonstrated until it had manifested itself as epilepsy. The electro-encephalograph has enabled us to detect predisposition, and so has made it possible to distinguish constitutional from accidental factors when both are present. WILLIAMS and SWEET (p. 430) have applied this method to the study of convulsions arising during anæsthesia. Of 22 patients who had had anæsthetic convulsions, investigated by electro-encephalography, three-quarters showed a persisting abnormality of cortical rhythm indistinguishable from that underlying epilepsy. They found no clinical evidence from a study of 42 cases that anæsthetic convulsions differed from epileptic fits, and conclude that anæsthetic convulsions are primarily due to an inborn latent epileptic tendency. Many of the factors which have been incriminated as responsible for precipitating anæsthetic convulsions are, they point out, well-recognised precipitants of epileptic fits in conscious subjects. There is ample evidence that such latent epileptics are present in considerable numbers in the population. LENNOX, GIBBS and GIBBS,[14] studying the incidence of cortical dysrhythmia among the near relatives of epileptics, found that, whereas 2·4% of the relatives of epileptics have epilepsy, in 60% the electro-encephalograph demonstrates a dysrhythmia. Thus dysrhythmics without epilepsy (latent epileptics) outnumber overt epileptics in the ratio of 25 to 1. Since in the United States 1 in 200 of the population is an epileptic, these writers conclude that "persons with a predisposition to epilepsy form about 12% of the population." Yet if the proportion of latent epileptics in the population is so high, is it not surprising that anæsthetic convulsions should be so infrequent? No doubt patients vary in their susceptibility to different precipitating factors, and anæsthetics also vary in their liability to cause convulsions. Many are definitely analeptic, being used indeed to control status epilepticus. Ether, however, with which anæsthetic convulsions are most commonly associated, produces persistent high voltage cortical discharges during induction.

To regard an inborn epileptic tendency as the primary cause of anæsthetic convulsions may be to simplify our ideas too much. The inborn tendency is already there, but the anæsthetic is no less essential; and possibly even the two together would not have induced convulsions if the blood-sugar had not fallen from preoperative starvation. Why does only one of every twenty-five people with cortical dysrhythmia become epileptic? To overstress the innate predisposition may produce a kind of fatalism and lead to gloomy headshaking over the four-and-twenty

10. Learmonth, J. R. and Richards, R. L. *Lancet*, 1942, i, 383.
11. See Ogilvie, W. H. *Brit. J. Surg.* 1944, **124**, 313.
12. Patrick, H. T. and Levy, D. M. *Arch. Neurol. Psychiat.* 1923, **10**, 715.
13. Brain, W. R. *Quart. J. Med.* 1926, **19**, 299.
14. Lennox, W. G., Gibbs, E. L. and Gibbs, F. A. *Arch. Neurol. Psychiat.*, 1940, **44**, 1155.

"latent epileptics." An innate predisposition to epilepsy is not something absolute, or even measurable: all men have an innate predisposition to convulsions if certain drugs enter the blood-stream or if an electric shock is passed through the brain; yet some people are more resistant than others to the convulsant effect of an electric shock. In other words, innate predisposition merely means that some people are nearer the threshold for fits than others; and it is probable that all gradations exist between the very resistant and those so much predisposed to attacks that slight humoral changes precipitate them. Moreover to oversimplify the problem tends to disguise the fact that the complex ætiology matters in prevention and treatment. We must be careful that the remarkable achievements of electro-encephalography do not blind us to that vision of the patient as a whole which we inherit from the great clinicians.

Germany

Colonel CUTLER, in his Linacre lecture, speaks of hatred as a necessary weapon of war; he believes that the recruit must learn to hate the enemy before he becomes a good soldier. Peace, he holds, should be made by those who have learnt this lesson; and experience of two wars leads him to recommend for Germany "surgical intervention of the most radical type." Perhaps if we knew precisely what form of surgical treatment our colleague and friend has in mind we should fully approve it. But we cannot go all the way with him if he suggests that the future of Europe will be settled most realistically by those whose feelings are strongest. Five years have not changed our opinion that a peace of understanding has more permanence than a peace of passion.

This war is not between men and some different species, but between men and men, in whom all the human elements are mixed. We can afford to admit that in ingenuity, courage and endurance our foes set a high standard. Our case against them is chiefly that they have been led into intolerable deeds by unbalanced emotion—that both at home and in the society of nations they have displayed the aggressiveness of the psychologically immature. The record of the Nazis shows plainly that their victory would have retarded the process of civilisation as this commends itself to the scientist. But unfortunately it does not necessarily follow that Allied success will hasten the civilising process. It will do so only if we strive continually and consciously to control emotion by reason. The part this country could play in promoting a rational settlement is influenced by the fact that, favoured by peculiar circumstances, it has acquired strength and yet has kept the mood in which it entered the struggle: we still like to think of ourselves as policemen, not rival gangsters. The young men who now command our thoughts, and bear our hopes, are often heroes but seldom fanatics; and for our part we should say that one of their greatest achievements has been to combine military resolution with an objective attitude towards the enemy. The demands now being made on them will be justified only if we repeat this achievement in the restoration of Europe. If we put reason before emotion, we can secure a wiser peace than the Germans would have made; and this is our only means of proving to posterity that ours was in fact the better cause.

Every surgeon now recognises that surgery, however radical, is not enough; after operation the patient must be carried over danger periods and restored to an active life—though not necessarily quite the same life as he lived before. In such aftercare, as Dr. GLAISTER points out,[1] we must enlist the help of the small minority of Germans capable of bringing their nation back into healthy activity. Prof. GILBERT MURRAY, discussing "de-Nazification," writes[2]:—

> "Is it possible to find another ideal, genuinely inspiring life-purpose, which may rouse in German youth a fraction of the same enthusiasm for a good cause that they have shown for an evil one? It is nonsense to expect them to be interested in British and American ideologies. ... Is there now any one great wrong, from which we all suffer and to which we have all contributed, to the righting of which the youth of Europe can be called to devote itself?"

The only hope he sees is in an appeal to rebuild civilisation; and he hopes that when young Germans see that Nazism debased the higher intellectual and artistic culture that was formerly the greatest pride of Germany, they may feel it an adequate purpose in life to rebuild out of the ruins the Germany of KANT and GOETHE and BEETHOVEN—to whom we might add VIRCHOW, KOCH and EHRLICH, or others according to taste. The *New Statesman* of Sept. 15, reviewing opinions collected from German prisoners in France, concludes that a state of political apathy is developing in Germany with the Nazi collapse, and adds: "In the reconstruction of Europe as a going concern, young Germans, after accepting their defeat, may find a new and useful outlet for their almost infinite capacity for work and obedience." The ultimate war aim of all of us, as Colonel CUTLER will agree, is a civilised world.

Social Security

THE white-paper on social security issued on Tuesday comes as a welcome surprise to the general public. Many thought that Beveridge had been shelved; others that he would be very freely diluted before issue. But the Government, though differing from him in details, has adopted the main recommendations of his report, and a Ministry of Social Security is to administer an all-in system of insurance for every member of the community. This will embrace family allowances, maternity grants and benefits, orphans' allowances, and death grants, and these will not be paid through approved societies. After the white-paper has been debated in Parliament the new minister will be appointed to take over all existing branches of social insurance and prepare fresh legislation; but family allowances, though they will not be paid until after the war, may be introduced before the rest of the insurance scheme, the suggested cash payments being 5*s*. weekly for each child after the first. Neither this nor the other rates proposed appear, from the medical standpoint, over large; and those who believe that security is socially damaging need not fear excess of it, in any form, during the years immediately ahead.

1. *Lancet*, Sept. 16, p. 391. 2. *Spectator*, Sept. 8.

Major H. R. Davies, RAMC, command specialist in physical medicine, will speak on Army physical development centres at 2.15 PM at a course arranged by the Ling Association in Manchester on Saturday, Oct. 7.

Annotations

MALARIA IN HOLLAND

BENIGN tertian malaria still persists in some parts of the Netherlands, though the rest of the country, like north-west Europe as a whole, has for years been practically malaria-free. The affected areas lie in the provinces of North Holland, in which the northern part of Amsterdam has a particularly high incidence, Friesland, Groningen and Zeeland. The distribution cannot be explained solely by the physical characters of those regions, for the equally low-lying province of Utrecht is virtually free. The only effective malaria vector is *Anopheles atroparvus*, and it is its preference for breeding in brackish water which determines the distribution. The water of North Holland, for example, has a salt content of 0·16% or more, whereas that of South Holland and Utrecht is relatively fresh, and though mosquitoes breed in it they are of the rarely malarious variety, *A. messeæ*. The non-infected *A. atroparvus* lives for choice in stables, but when infected it seems to prefer human dwelling-houses, and only leaves them to lay its eggs, which it does mainly in narrow and weedy ditches. Malaria transmission chiefly depends on the "healthy" carriers, especially children, in the endemic areas, and these are probably as numerous as the persons showing symptoms of the disease; such carriers, of course, escape specific treatment. There seems to be a paradox in the seasonal incidence of the benign tertian malaria, for though the vector becomes infected after the middle of August, when its sexual activity is over, and carries normal sporozoites from then till December, the highest incidence of human cases is in May–July when the mosquito is free of infection. The explanation lies in the long incubation period, which may be 6–12 months, during which the parasite, *Plasmodium vivax*, remains latent. A man bitten by an infected mosquito in early October may therefore not show symptoms till the following spring or summer. The total cases notified in Holland were 677 in 1941, 743 in 1942, 855 in 1943 and 1019 in the first half of 1944. It is perhaps significant that by far the highest monthly figure during this period was June, 1944, with 576 cases. The figures for these 3½ years represent a case-rate of only a fraction of 1% in the population of 8¾ million (prewar), but in epidemic years, such as 1919–22, the case-rate has risen to 12% and over. The Germans have flooded nearly the whole province of Zeeland and the polder called "De Beemster" which forms part of North Holland. In both North and South Holland all pumping engines have been stopped, so that some 8% of the country will probably be flooded in time. No immediate rise in malaria incidence would be expected from the flooding because most of it is done with water too salt for the *A. atroparvus* to breed in, but there may well be an epidemic when the salt content of the ditch water falls.

ELECTRICAL INJURY

Two papers presented to the European Association of Clinical Pathologists during the past year draw attention to a somewhat neglected form of injury. Professor Jellinek[1] has spent a lifetime in the study of electrical lesions and his views bear not only on fundamental questions of tissue pathology but also on treatment. It is in the central nervous system that severe electric shock makes its most frequent manifestation, though the current is said to pass only rarely through the brain. In addition, many other parts, both superficial and deep, may be injured. There is a good account in a book for students by Forbus,[2] but nearly all other textbooks fail to make the points clear and Jellinek remarked sorrowfully that there is a lot of unnecessary suffering and disability in consequence.

The first fact to get hold of is that an electric lesion is not a burn; treatment on such an assumption will only lead to disappointment. Confusion is doubtless partly due to the fact that an electric shock may be accompanied by free discharge and a spark, which may lead to true burning as well as electric damage. There is general agreement that the lesion is macroscopically characteristic and probably specific. It is true that some of the same microscopic changes in the epidermis can be shown in experimental lesions by dry heat alone, but this is only to be expected since heat is obviously a factor in electric pathology. The most striking feature is that there is no pain and no inflammatory reaction. Alexander[3] calls it a functional cessation of vital activity; Jaffé[4] says that it seems as if the defence mechanism of the tissue has been paralysed; Jellinek describes it simply as a state of suspended animation, and the term might be justified by the remarkable way recovery sometimes ensues without sequelæ. Even if necrosis and separation take place the absence of reaction makes for a smooth pliable scar. Jellinek declares (and he produces the evidence) that if the injuries are treated as burns, toxæmia, suppuration and deformity are inevitable, whereas if they are treated sui generis good results may be expected. Masterly inactivity seems to be the password. In spite of a considerable accumulation of histological data, there is evidently great scope for further study of these electric wounds, which seem at first sight to flout the ordinary rules of biological reaction to injurious stimuli. The pathological basis of the lesion is apparently long-continued vasoconstriction and vasoparalysis with subsequent stasis and thrombosis in the vessels. Jaffé says that the root cause is the passage of current and the transformation of electric energy into heat which injures the tissues along its path. He maintains that electrolysis does not play a rôle because the structure of the current markings is the same with alternating and direct current. We need not take this to mean that heat is the only factor or that other electric effects are not operative. Moreover, Morrison, Weeks and Cobb[5] have produced experimental evidence that in nervous tissue there is a difference in the effect of alternating and direct currents. Spitzka and Radasch[6] also thought electrolysis a possible factor in the cerebral damage after judicial electrocution with alternating current. Jellinek ranges his microscopic findings with the physicist's discoveries rather than with orthodox cell pathology as we know it.

On this basis tissue struck by lightning might be said to be in a polarised state within Faraday's meaning and the cellular pattern comparable with the pattern of metallic particles in an electromagnetic field. One can even find right and left corkscrew markings on the body surface which are like a photograph of a streak of lightning. By the same token, Jellinek sees the histological picture of affected tissue in terms of the laws of electric force and describes "condensation" of cells, nuclei and fibres at the point of positive discharge, and the reverse, "relaxation," caused by the negative discharge. There is a long way to go before we can show complex living tissue obeying electrophysical rules, but, as the Autocrat of the Breakfast Table said (and his creator was an anatomist of repute) "The more we study the body and the mind the more we find both to be governed not *by*, but *according to*, laws such as we observe in the larger universe."

1. Jellinek, S. Electrische Verletzungen. Leipzig. 1932.
2. Forbus, W. D. Reaction to Injury, Chicago, 1943.
3. Alexander, L. *J. industr. Hyg.* 1938, **20**, 191.
4. Jaffé, R. H. *Archiv. Path. Lab. Med.* 1928, **5**, 837.
5. Morrison, R., Weeks, A. and Cobb, S. *J. indust. Hyg.* 1930, **12**, 325.
6. Spitzka, E. A. and Radasch, H. E. *Amer. J. med. Sci.* 1912, **144**, 341.

With increasing electrification of the home and the greater use of alternating current, which is much more dangerous than direct at the same nominal voltage, the subject is likely to become more topical. Experts are united in deploring the inadequacy of first-aid and general treatment owing to ignorance of the true nature of the injuries; for instance, paralysis of the respiratory centre requires artificial respiration continued up to eight hours, and external injuries need careful handling because they may turn out to be much more extensive than appears at the time. It might be well to clear the ground before the accidents happen.

GIANT NERVE FIBRES

OTHER things being equal, the rate of conduction in a single nerve-fibre depends on its diameter and on the properties of its surface sheath. These may vary independently. A large animal can therefore make allowance for the greater length of its nerves (and the sluggishness that this would otherwise imply) in alternative ways: by having wider fibres, or fibres which are in some as yet undefined way more "richly" medullated. The squid *Loligo* appears to have adopted the former solution. The squid's unmyelinated giant fibres, long thought to be blood-vessels until their rediscovery and correct interpretation by Young,[1] may exceed 1 mm. in diameter: they are the largest nerve-fibres in the animal kingdom. Yet the "solution by size" is not a very satisfactory one; for the rate of conduction of a fibre does not increase in proportion to its diameter, but by a factor more or less proportional only to its square root. The myelinated fibres of the prawn conduct at about the same rate as the largest in the squid (25 metres per sec.), although their diameter does not exceed 35μ. Mammals, in spite of their great range of size, do not appear to use an increase of fibre diameter as a means for keeping pace with length, for the fibres of large mammals are little wider than those of small.[2] The giant fibres of the squid are interesting for many other reasons. If they are cut, the axoplasm within them flows out to form a bleb, and it is only after the coagulation of this exudate that those once familiar histological entities, the neurofibrils, make their appearance. This confirms Ranvier's suspicion that the axoplasm is a viscous fluid, and at the same time shows that neurofibrils are not material structures in the histologist's sense (as elastic fibres, for example, are). Microanalytical studies may be made on the axoplasm that flows out or is expressed, a fact which has thrown much light on the composition[3] and ionic balance[4] of nerve. Both as large cells and as large nerve-fibres, the giant fibres of the squid evidently have a great future before them.

RENAL TUBERCULOSIS, HYPERTENSION AND NEPHRECTOMY

THE demonstration that renal ischæmia is a potent raiser of the blood-pressure was greeted with surgical enthusiasm; but it is now recognised that nephrectomy is indicated in only a small minority of cases of hypertension. Braasch[5] showed that of the 4000 cases of hypertension seen in one year at the Mayo Clinic, only 100 (2·5%) showed clinical evidence of a non-nephritic lesion; and of this group only 19—less than 0·5% of the 4000—were considered suitable for nephrectomy. The renal lesion amenable to surgical treatment most often associated with hypertension is generally agreed to be unilateral atrophic pyelonephritis; but other lesions, not so well recognised may also cause it, and among these renal tuberculosis is perhaps most often ignored. Among 23 such cases all coming to necropsy, recorded by Baehr and his colleagues,[6] there were only 3 with hypertension; but in 18 there were changes in the renal glomeruli, and conspicuous vascular alterations were present in the kidneys of 20. Braasch[7] found hypertension in 12 (7·6%) of 158 cases of renal tuberculosis; and noted from a follow-up that in half the cases in which renal tuberculosis was associated with hypertension, operation caused a fall in pressure. Among 231 cases collected from published papers in which nephrectomy was done for hypertension, presumably originating from a single diseased kidney, Patton and his colleagues[8] found 18 cases of renal tuberculosis; in 5 of these there was either no change, or a rise, in the blood-pressure after operation; in 3 it fell, but not to normal limits; while in 10 there was a "sustained return to normal." Comparable figures for cases of pyelonephritis in which the blood-pressure returned to normal after operation was 22 out of 43 cases. Richardson and Smart[9] have reported a case, probably not included in this series, in which a man of 35, known to have been hypertensive for at least 4½ years, had nephrectomy for renal tuberculosis. Before operation the blood-pressure had ranged from 235/140 to 245/140 mm. Hg; 7 months afterwards it was 150/120 mm. Hg. On another page Leiper reports an even more striking case in which the blood-pressure of a girl of 18 fell from a preoperative level of 240/170 mm. Hg to 130/90 mm. Hg 18 months after operation.

In renal tuberculosis nephrectomy is usually required for the underlying lesion, apart from the question of hypertension. In other cases of hypertension associated with unilateral renal disease the decision may not be so easy. Schroeder and Fish[10] have postulated as the criteria for nephrectomy: development of hypertension within two years of the onset of disease; a renal lesion confined to one kidney with diminished function of this kidney; normal ability of the kidneys to concentrate urine and normal urea-clearance test; absence of retinitis; persistently raised blood-pressure. These are merely guiding principles, not absolute rules. Sensenbach,[11] reviewing the effects of unilateral nephrectomy in hypertension from a study of 75 published cases, presents similar but not identical criteria, but he, on the contrary, considers these should be rigidly met. Thus, the diseased kidney should be functionless or its function much diminished; the opposite kidney should function normally; the hypertension should be of short duration; and the patient should be young, since other factors being equal the younger the patient the greater the chances of a favourable result. Probably there must always be exceptions: in Leiper's case, for example, there was papillœdema, and renal function was much impaired. Dickson Wright[12] holds that the importance of the surgical kidney in hypertension "should be written down rather than up," but when the kidney is removed for renal disease associated with hypertension he recommends that sympathectomy should be done at the same time. He also recommends biopsy of renal parenchyma in hypertension while the kidney is exposed for splanchnicectomy. Sympathectomy was done in Leiper's case, though the nephrectomy can almost certainly be credited with the fall in blood-pressure.

Lumbar sympathectomy has been in vogue for nearly 20 years in the treatment of hypertension, but there is still no unanimity, even among its proponents, about

1. See the review of J. Z. Young in *Endeavour*, July, 1944, p. 108.
2. Bjorkman, A., Wohlfahrt, G. *Z. mikr.-anat. Forsch.* 1936, **93**, 631.
3. e.g., Bear, R. S., Schmitt, F. O. and Young, J. Z. *Proc. roy. Soc. B*, 1937, **123**, 496.
4. Webb, D. A. and Young, J. Z. *J. Physiol.* 1940, **98**, 299.
5. Braasch, W. F. *Amer. J. Surg.* 1942, **56**, 209.
6. Baehr, G., Klemperer, P. and Schifrin, A. *Trans. Ass. Amer. Phys.* 1935, **50**, 139.
7. Braasch, W. F., Walters, W. and Hammer, H. J. *Proc. Mayo Clin.* 1940, **15**, 477.
8. Patton, H. S., Page, E. W. and Ogden, E. *Surg. Gynec. Obstet.* 1943, **76**, 493.
9. Richardson, G. O. and Smart, G. A. *Lancet*, 1941, ii, 594.
10. Schroeder, H. A., Fish, G. W. *Amer. J. med. Sci.* 1940, **199**, 601.
11. Sensenbach, W. *Arch. intern. Med.* 1944, **73**, 123.
12. Wright, A. D. *Proc. R. Soc. Med.* 1943, **36**, 563.

its real effects. Thus de Takats and his colleagues [13] could only report "good results" of splanchnicectomy in 6 of their 30 patients with hypertension. They used transdiaphragmatic splanchnic nerve-section as described by Smithwick.[14] This involves complete resection of the major splanchnic nerve, from the 5th dorsal root down to its entrance into the cœliac ganglion; in addition the sympathetic ganglionated trunk is removed from the 9th dorsal to below the 2nd lumbar ganglion. Ayman and Goldshine [15] followed, for as much as 5 years, 14 patients with hypertension in whom sympathectomy had been done. They too consider that transdiaphragmatic splanchnicectomy with dorso-lumbar ganglionectomy gives the best results, but as only 3 of their patients had this operation the conclusion cannot carry much weight. Repeated operations were necessary to achieve a sweeping sympathectomy, and it seems possible that the patient was overlooked in an enthusiastic effort to cure or alleviate the disease. Sympathectomy has probably been done in about 3000 cases of hypertension during the last 18 years; if this was the best therapy for hypertension we should know it by this time. It can at most be regarded as one of the ways of alleviating hypertension in carefully selected cases. Nephrectomy for the relief of hypertension in patients with unilateral renal disease is more rational and justifiable, and in selected cases is undoubtedly the treatment of choice provided it is carried out early enough.

MINERS IN A CHANGING WORLD

> "The history of occupational diseases is infinitely more than medical history. ... It reflects as in a mirror the history of industry and the history of labour, in other words some of the most important chapters in the history of civilisation."

So writes Henry Sigerist, in his foreword to Dr. George Rosen's book *The History of Miners' Diseases* (New York: Schuman. $8.50). The morbid accompaniments of one of man's primary industries can be related not only to the hazards of mining itself but to advances in technical processes; and the prevalence of disease and injury fluctuates with advances in medical science and with changes in the social and economic background. Dr. Rosen begins his history in neolithic times, and ends at the beginning of this century; but his social approach points many lessons for the present day. Much of his beautifully illustrated and well-documented book deals with pneumoconiosis; but ankylostomiasis, metallic poisonings, noxious gases and fumes, neoplasms, and accidents are all well discussed. Miners have been hardly used through the ages, from the time when whole families of war-captives, sent to slavery in the Greek silver mines, helped to build the cultural and military power of ancient Athens, to a century ago when young English children toiled ankle-deep in water for twelve hours daily at underground pumps. By slow and painful steps the protective legislation of the nineteenth century was enacted, its advance, as Dr. Rosen shows, more often due to agitation by the men themselves, by their much persecuted trade-unions and by a few ardent reformers, than to any stirring of public conscience in response to medical investigations; and all was achieved in face of determined opposition from vested interests. Responsibility for occupational diseases cannot be assigned coolly to the hazards of the job, or to lack of medical information. Morbidity in industry is some measure of the balance between the demands made by society on its producers of material goods, and the vigour and ability with which these producers defend themselves against undue inroads. In this century we have seen medical research and social reform take hands for the common purpose of improving health; and a sample of their joint authority is to be found in recent British mining legislature. Can Dr. Rosen be persuaded to develop his theme in a second volume, covering the first half of the twentieth century?

13. de Takats, G., Heyer, H. E. and Keeton, R. W. *J. Amer. med. Ass.* 1942, **118**, 501.
14. Smithwick, R. H. *Surgery*, 1940, **7**, 1.
15. Ayman, D., Goldshine, A. D. *New. Engl. J. Med.* 1943, **229**, 799.

SENDING BLOOD TO FRANCE

In the six weeks following D-day over 17,000 bottles of whole blood were sent from this country to the British Forces in France. Of these, over 15,000 were produced by the Army Blood Supply Depot established at the beginning of the war under the command of Colonel (now Brigadier) L. E. H. Whitby. As headquarters and training centre of the Army Blood Transfusion Service, controlled by the Director of Pathology at the War Office, the Army depot has played an important part in the medical history of the war, and in the process has provided an immense amount of transfusion and infusion material and equipment. In the West Country regions where it operates, medical officers of the depot have now bled about half a million donors. In the years between the fall of France and the invasion of Normandy, they concentrated on producing plasma which could be stored for long periods at home or abroad; and up to the end of last March some 265,000 bottles of plasma had been issued, of which 181,000 contained the dried product. But as soon as fighting started within easy flying distance of this country it naturally became necessary to send out fresh whole blood to be used in addition to the plasma which the medical units took with them. The demand was such that it could not be met continuously from the West Country panel, large though this is; for donors are not called on more often than once in three months. Accordingly, after the Army Service had bled some 15,000 group O donors, more help was sought from the Medical Research Council and the Emergency Medical Service; and during August the MRC depot under Dr. Janet Vaughan, and the EMS centres, provided a large proportion of the blood flown to France, as well as continuing their supplies to home hospitals receiving wounded from overseas and casualties caused by flying bombs.

At both military and civilian depots work has continued for several months at very high pressure to meet these needs and the rapidly increasing demands from the Far East. The donors and the services concerned deserve our thanks for providing, despite difficulties, an effective remedy in effective quantities.

Sir HUMPHRY ROLLESTON'S death on Sunday at the age of 82 will be felt as a loss wherever medicine is known, for his stupendous industry in collecting and presenting facts was associated with a facility in making human contacts. The motto of his life might well have been *arduus ad solem*, leaving it open whether the warmth was the cause or the effect of his endeavour.

Prof. C. BRUCE PERRY will deliver the Bradshaw lecture at the Royal College of Physicians of London, Pall Mall East, S.W.1, on Thursday, Nov. 9, at 2.30 PM. He is to speak on the ætiology of erythema nodosum.

Dr. A. N. DRURY, FRS, and Prof. J. C. SPENCE have been appointed members of the Medical Research Council.

IT is becoming apparent that many species of moulds besides *Penicillium notatum* produce penicillin-like substances. H. W. Florey and his colleagues in Oxford have shown (*Nature, Lond.* Aug. 26, 1944, p. 268) that a further five members of the penicillium genus do so, some of which are widely separated morphologically from the notatum group.

Special Articles

STRESS DYSPEPSIA IN INDUSTRY

G. P. B. WHITWELL, MD, DPM
WORKS MEDICAL OFFICER

IT seems to me that dyspepsia in a community can be profitably studied from the purely sociological standpoint, and that as much information can be gained by listening to patients as by subjecting them to gastroscopy, test-meals and X rays. The Service studies of dyspepsia often confine themselves to very simple objects, such as ascertaining the presence of an ulcer or ruling it out. Having done that, the question of "disposal" arises. Unfortunately for civilian doctors, they cannot dispose of their patients.

In an industry where many of the environmental factors are known to the works' doctor, it is possible to assess these factors in precipitating or aggravating a dyspepsia. A great deal of this dyspepsia would ordinarily be called "nervous," which is a misleading term because some types of dyspepsia to which it is applied do not occur in constitutional psychoneurotics; neither are they, strictly speaking, precipitated by emotional or nervous crises. Some could rightly be called fatigue or stress dyspepsias, and these, while common enough, do not get much mention in medical literature.

The setting of my cases was a large modern aero-engine factory where the working hours varied from 55 to 84 per week, most employees working the lower hours but generally at great pressure and with rather impersonal supervision. Many were unused to factory life.

ORIGINS

Change of Shift.—I have mostly observed employees on a fortnightly change of shift; that is they did one fortnight of day work and one fortnight of night work. The fortnight's night-shift was composed of 10 nights of 11 hours' work, the Saturdays and Sundays being free. The employees suffered a great deal from dyspepsia attributed by them to the shift work; and undoubtedly the free Saturday and Sunday of those on night shift only made matters worse because they were able to revert to a day routine in the middle of the night-shift.

The workpeople commonly noted that if they slept well they digested well, and that the ability to sleep was the principal factor in digestion. The girls suffered more than the men from changes of shifts. The symptoms started with a regular "change-of-shift syndrome" of anorexia, insomnia and constipation. For some, these were the only symptoms, but in many epigastric discomfort, vomiting and loss of weight supervened. At one time or another 20% of the whole factory were absent from work with medical certificates signifying gastric disorders. Irritability and a tendency to cry were noticeable in the more delicately nurtured. Many who had endured shift changes at monthly intervals broke down on a "fortnight about" and the change-of-shift symptoms, while occurring mostly on the night-shift, also attacked those who having been on nights for some months were suddenly put on days. The workpeople attributed their symptoms to the *night-shift* and preferred the fortnightly to the monthly change-over because the spell of nights was shorter. This preference is, of course, a fallacy in that it was the change rather than the night work that upset them.

Fatigue.—Long travel, combined with long hours, cause a fatigue indigestion in some, and in many people fatigue of long standing manifests itself in dyspepsia. Shopping, housework, overtime and dances also added their burdens. A great many who had anorexia put it down to being tired and that they "couldn't be bothered with food"; and in some of these people, while the appetite refused food, beer could be drunk in lieu. Thus the excessive beer-drinking of the war-worker was in itself often a fatigue symptom; if bitter beer was drunk this appeared to add to the fatigue symptoms that of an irritable gastro-enteritis. However tired a girl was, it was uncommon for her to give up dances, and would be inhuman to expect her to do so.

The Factory and the Olfactory Sense.—New employees often suffered from nausea and anorexia due to the smell of hot oil or paraffin, and some of them vomited on entering the factory. The workpeople attributed many gastric symptoms to oil getting into the system or "on to the stomach."

While the problem of noise is being dealt with in industry, the problem of smell has not even been considered because it is so generally accepted as an Act of God by the experienced employee. Yet smells have the most profound psychological effect and cause epigastric discomfort in many. One benzene-containing solvent had such a powerful tarry smell that a few days' work was disrupted. Some solvents also disturb digestion by their somatic effect, and one group of men working in carbon tetrachloride had severe gastric symptoms from this solvent. It was interesting that the smell alone would bring on many of the symptoms in those that had previously been somatically affected and that conversely many of the symptoms could be inhibited if the smell was disguised. Some of these men had been investigated by outside doctors using X ray and test-meal, but no inquiry as to the man's occupation had ever been made.

Some cutting oils contain whale oil and are obnoxious and nauseating when used, as the heat generated in machining intensifies the smell. The fumes of oxy-acetylene or arc welding, the shot of shot blasting, the dust of polishing, and the fumes of petrol or exhaust gases, while perhaps not organically upsetting the stomach, may produce dyspepsia, even in experienced employees. Reassurance that no structural harm is being done often has little effect and it is doubtful whether many people of sensibility would tolerate some conditions if they had freedom of choice. It has to be remembered that most people do not disarm their sensory perceptions by scientific approach. For them petrol is not hydrocarbon, nor their cutting oil mineralised lard oil; but a bad smell is to them a bad smell.

Peptic Ulcer.—The employee with a peptic ulcer is often upset by changes of shift. His symptoms are primarily those of anorexia, insomnia and constipation, as suffered by those who have no ulcer; but in the long run his ulcer is likely to give him more trouble if he changes shift frequently. Three times one man had a small hæmatemesis on attempting night-shift.

Ulcer patients are often anxious about chemicals in use in the factory lest they upset their ulcers. Paint-spraying may initially make anyone queasy, but a man with a gastric ulcer may get seriously alarmed and ask to have his job changed. As the ætiology of peptic ulcer has not been satisfactorily elucidated it is difficult to advise in this sort of case. It would seem undesirable for a person with a gastric ulcer to suffer nausea for any long period; and if his ulcer does break down the onus is very much on the doctor. This seems to be one of those very frequent situations in industrial medicine where the doctor can learn more from the patient than the patient can learn from the doctor.

Patients with gastric ulcer often believe that grinding-wheel or other dusts upset their stomachs.

Home and Dietetic Factors.—It has been pointed out often enough that factory workers have many domestic habits which seem curious to more comfortable folk. That of having no breakfast is one. To get to work at 7.30 AM with an hour's bus ride, means having a meal at an hour which is very dim and unpleasant for those not accustomed to factory life; and the appetite is absent in consequence. At 9 AM when the trolleys come round with tea the appetite has reappeared because ten minutes' relaxation is given. Many people do not like canteen food, so their main meal is at night. Such a routine should be a good way to induce dyspepsia. Many say that they are too tired to eat a big meal midday but can manage buns and tea. Many also say they vomit in the mornings, and this appears to be a not unusual stress symptom.

Impersonal Supervision.—In their first weeks people unused to factories often have nausea, vomiting and anorexia due to new surroundings. It is therefore always better for the labour manager to be in charge of welfare and to see that all new workers are regularly visited during their anxious initiation period. The

larger the factory the more this is necessary—in fact there is no doubt that the smaller factory is more efficient than a big factory in some of the human sides of employment. The feeling of the smaller community could be imitated in the large factory by breaking down the organisation into small sections. Such a scheme would be physiologically desirable and many stress symptoms would disappear. A glimpse of this side is often seen in our larger industrial concerns when girls try their hardest to work on the same shift and in the same workshop as their friends.

Muscular Exertion.—Not only employees with peptic ulcer, but those who have indigestion without ulcer, frequently complain that heavy lifting, and work involving the use of the abdominal muscles (e.g., window-cleaning), brings on their symptoms. Such complaints cannot by any means always be explained by lighter and more remunerative work being available in the same factory. In any case the diets of dyspeptics may be insufficient for heavy muscular work.

DISCUSSION

I have noted things down which may be only imagined by the workpeople, but it is perhaps wise to listen to everything. For example, many employees have a healthy fear of dusts, and I have heard shot blasters and polishers say that the dust often upsets their stomachs and that they have black stools possibly due to iron or steel which is ingested. The foreman may say that this is a myth; but it is certainly a curious myth to have invented.

The war seems to have taught us that many people develop indigestion under stress; but my impression is that few develop peptic ulcer as a result of industrial conditions; nearly all the ulcers coming to the factory had a long previous history. About 5% of the male employees had a peptic ulcer, this number being swelled by discharges from the Army. It was depressing to view all this indigestion and to be able to do little about it; though the works' doctor is in a happier position than the outside doctor in that he can, to some extent, change the worker's environment. Unfortunately, production does not permit unlimited transfers, changes of job or cutting out of overtime and nightshift, and in order to have latitude for transfers and adjustments for those already in the factory it was sometimes necessary to reject new employees who would be unable to do nightshift or overtime. The bad effects of changes of shift suggest that the human body functions best when the routine is regular and monotonous with little change from day to day.

Unnecessary casualties are wrong in war and it is doubtful whether enough care has been taken that no worker travels an unnecessarily long distance to work. I have met cases with nearly 4 hours' daily travel and these always crock up. Hours of work are still too long in many factories, and one has only to look at the labour turnovers considered normal in some well-appointed factories to realise that all is not well.

It is not too late to correct these mistakes. While the high fighting power of an army is often attributed to the sort of generalship which looks after the personal welfare of the men, less attention has been paid to this matter in the case of civilians. Physical fitness has been found to be one of the deciding factors on the battlefield, but this discovery has not been universally recognised as applicable to industrial conditions. This may be important to us not only now but also in the postwar era when industrial competition will decide the fate of this country.

It is a great pity that an expert body of opinion like the factory inspectorate should have had difficulty in persuading employers, and even government departments, of the harm done by long hours.

THE efficacy of the new insecticide, DDT, against agricultural pests has been demonstrated in Pennsylvania, where a 20-acre wood infested with gypsy-moth caterpillars was sprayed by aeroplane with 20 lb. of the chemical per acre. All the caterpillars and other leaf-feeding insects, as well as the mosquitoes and black flies present, were killed; birds and cattle were unharmed. (*Science*, Aug. 11, 1944, suppl. p. 10.)

DOCTORS FOR GERMANY

UNRRA will as soon as possible establish in Germany assembly centres for "displaced persons" and will also form flying squads. The director of health in the European Regional Office hopes to recruit from Great Britain and Northern Ireland 50 chief medical officers for assembly centres and 10 doctors for flying squads.

In making appointments to the assembly centres, preference will be given to doctors with administrative experience. They must have organising ability and capacity to act on their own initiative. They will be working with colleagues and subordinates of all nationalities, many of whom will themselves be displaced persons, and they will have to deal with the military authorities and with representatives of Allied governments. The remuneration offered is £1000–£1300 per annum, plus foreign service allowances.

The doctors for the flying squads should be clinicians under 40 years of age. They will travel through Germany in mobile vans with a small staff. The salary offered is £600–£750 plus allowances.

The period of service will in most cases be 6–12 months. Selected candidates may be required to take a short training course, and be ready to go abroad if necessary at an early date.

Applications should be made in a letter with record of age, experience, qualifications and present appointment. They should be sent to the hon. secretary of the local medical war committee for the area in which the applicant practises, in order that the committee may express a view as to whether he can be spared from the area. Having added their comments the local committee will forward the applications to the Central Medical War Committee or (in Scotland) to the Scottish Central Medical War Committee.

Any practitioner unable to establish contact with the hon. secretary of his local medical war committee should send his application to the secretary of the Central Medical War Committee, BMA House, Tavistock Square, London, W.C.1, who will then consult the local committee. The speedier course, however, is to communicate first with the hon. secretary of the local committee. The matter is urgent and immediate applications are invited.

Reconstruction

THE ALMONER'S PART

ANN M. BALLANTYNE, AIHA

ALTHOUGH almoners as a professional class have been in existence for many years now, I am still asked "What does an almoner do?" or "How will almoners fit in with the new schemes involved in postwar reconstruction?" If it is possible that these questions can still be asked, perhaps we have failed in some way to make our work and its scope known to the medical profession and to the general public as a whole. This article is therefore compiled in the hope of expressing more clearly how an almoner can be used by the overworked medical profession.

The medico-social worker is a specialist in the hospital, clinic or dispensary, who seeks as a member of a team to give advice on social and economic problems, and to provide the hospital or dispensary staff with guidance on how patients' home difficulties may be overcome. In order to deal with these problems, and the now ever widening field of work, it is necessary for the medico-social worker to be trained. All almoners should be qualified and the majority are; but there are still some who call themselves almoners who have not had the real groundwork and training necessary.

HER TRAINING

Training is in two parts—theoretical and practical. The theoretical training is undertaken at a university, after some experience of practical social work has been gained, or after a degree has already been taken. The social science course at university consists of the following subjects: psychology and social ethics; economics; social and industrial history; public administration (which includes intimate knowledge of acts of Parliament dealing with social conditions); physiology and hygiene.

This course is very varied, being taken by all types of social workers such as would-be probation officers, care committee workers, factory inspectors, club leaders, and psychiatric social workers. During it, practical experience, lasting at least 4 months, is gained in family case-work; she learns the art of interviewing and also how to keep reports, statistics and records. This entails visiting and reporting on applicants, and learning how to meet their varying needs. Visits to housing estates, factories and other places of social and economic interest are also made. This part of the course lasts for 2 years, or, if a sociological degree is taken, possibly 3 or 4 years. If accepted by the Institute of Hospital Almoners as a student, the almoner is then given another year's experience in various almoners' departments throughout the country.

At the end of this training the medico-social worker should be fitted to help patients in whatever sphere she chooses. And her choice will no doubt soon be extended to include not only work in voluntary and municipal hospitals, dispensaries, EMS hospitals and rehabilitation centres, but also work in health centres, and with general practitioners.

DUTIES IN HOSPITAL

When a patient first attends a clinic or hospital he should be seen by a medico-social worker. Her subsequent reports on the patient's attitude to disease, his work and home conditions, should be available for the doctor. At the same time she can ease the patient's mind about his home and his future, and so strengthen his morale and help him to overcome the shock of diagnosis or the thought of being ill for a long time. The intimate and confidential records of patients' lives, of their hopes and fears, ambitions and desires, economic and social status, and the ultimate result of medical treatment and aftercare, are fully kept by the almoner and her department. Only too often, at the present time, she finds that doctors do not realise the scope of her work, and neglect opportunities of obtaining information and of referring patients for help.

Some doctors at present are much too busy to regard their patients other than as "discrete pathological entities." Even in hospitals, where there is probably more time, doctors have no opportunity themselves of finding out how big a part the social and economic circumstances of the patient have played in the "successive and interdependent stages of the progress of the disease." Nor have they time to find out if their instructions are carried out when patients leave their care, and often the ultimate result of all their work is never known to them.

The doctor's skill and care are frequently less effective than they should be because of the conditions under which the patient lives or works. The miner, suffering from gastric ulcer, who has to return to the mine to crouch or to lie on his stomach to hew coal, and to eat hurried meals at the canteen; the young adolescent who, suspected of tuberculosis, works long hours on night-shifts at the factory, and sleeps in a damp overcrowded room—these are but two of the innumerable instances where more than medical care is needed.

Here is an opportunity for the almoner. She can inform the doctor, and aid him by seeing that the simple fundamental things in life are provided, and by trying, as far as possible, to give the patient security so that he may more quickly recover from the effects, both in body and mind, of his illness. Then, by planned and supervised aftercare under doctor's instructions, she helps to expedite the man's full recovery, and to overcome social disabilities which may have arisen from the disease or injury. As she has detailed knowledge and close contact with the statutory and voluntary social services, it is her function to mobilise those services in the community which are appropriate to the patient's needs.

Each patient requires specific and individual help; the aftercare which the doctor may recommend will include such things as convalescence, institutional treatment, spa treatment, admission to sanatoria; arrangements for attendance at psychological clinics; supply of necessary instruments and appliances; arrangements for transport, payment of fares and escorts; inquiries to see that the family have enough money with which to pay the expenses of diet, extra nourishment or home help; advice and guidance on adoption and the numerous problems of the unmarried mother; arrangements for the district nurse to visit, and the health visitor to keep an eye on the family; advice about motor accidents, housing accommodation, divorce, separation, pensions, and so on.

A great part of this work is connected with rehabilitation. Recently the Ministry of Labour have urged that almoners be employed in the new rehabilitation centres to act as liaison officers. The medico-social worker has usually been in touch with the patient from the day the diagnosis was first made. She knows of his previous occupation and his social background. As a friend she has gained some idea of his temperament, his interests and ambitions, and should be able to assess his mental as well as his physical health. She is therefore in a position to interpret the patient's and the doctor's wishes to the Ministry of Labour official. In serious cases she should arrange for the official to learn the surgeon's wishes directly. With the help of the employment exchange she should be able to suggest the most suitable type of work or training. At present work of this kind is being undertaken by medico-social workers in most voluntary and municipal hospitals, and in some rehabilitation centres and tuberculosis dispensaries; but the work will no doubt expand in the future.

Almoners who work in special departments, such as those for neurological and venereal diseases, or in tuberculosis dispensaries, maternity clinics, rheumatism and cancer clinics, find the scope of their work varies according to each type of patient but it will always be based on the same principle—namely, that the family as a unit should be assisted, and the patient should be encouraged to become once again independent, and as far as possible a normal healthy citizen. Specialisation by the medico-social worker in these various types of clinics will probably be extended under the new health schemes, especially if encouragement and guidance are given to local authorities by the Government.

At present almoners are already working in EMS hospitals where they have to coöperate with authorities in voluntary and municipal hospitals, with military registrars and Army welfare officers with officers in rehabilitation centres and with factory welfare officers. The Ministry of Health have recognised the almoner's work in EMS hospitals, and have also advised local authorities to employ medico-social workers in municipal hospitals, in tuberculosis dispensaries, and especially in venereal disease clinics.

HER PLACE IN THE HEALTH CENTRE

The new health centre is rather nebulous at present, but I think the medico-social worker could be used by the doctors at the centre in the various ways described. Doctors should be able to use the almoner's department in the same way as they will use pathological and physiotherapy departments of the centre. Patients will probably tend to look upon the social worker more and more as a friend and adviser. It is doubtful whether the almoner will have time to visit homes, but attached to each centre there would probably be the health visitor who would look after the needs of family units, referring patients in need of special help, and reporting on home conditions.

Doctors have suggested that the almoner's department in the health centre should also be responsible for records and statistics; and it could be used as a clearing house through which medical records could be transferred as patients move from one centre or hospital to another. Not all almoners would agree with this view, but if she is to take on the task, the almoner should have her own secretary, and adequate clerical assistance for these new duties.

Apart from work in hospitals and health centres, she could be used by groups of general practitioners to deal with the economic and social problems of their patients. Practitioners would be able to refer patients to her for advice and aftercare. It is not necessary that these doctors should be working together; she would probably be able to deal with all patients within a certain area.

An almoner can be used by the doctor for many other purposes besides aftercare and following up. She may be able to assist in research on various diseases, where economic, social and psychological factors are involved, and may be able to provide data indicating whether

illness is due to heredity, to bad social conditions, or wrong lines of thought. If she is interested, she may help to enlighten public opinion about social improvements and legislation.

The Ministry of Health have recognised the almoner, but it is to the doctor that she looks for support. The scope of her work depends on him, and the doctor should become more and more conscious of the help which she can give him; she can save his time, and supplement his knowledge.

Almoners hope to take their share in giving social medicine its appropriate place in preventive medicine and the medical curriculum. The postwar world will call for more work, not less: let it be enterprising and courageous.

In England Now

A Running Commentary by Peripatetic Correspondents

LISTENING in to the 7.55 AM uplift talks, in which we are told what the Deity says, wants, hopes, is surprised at (yes, twice) and confidently anticipates (only once so far), it is borne in on me that there is also a real need for an official super-psychologist, a Psychological Primate—not a Minister of Psychology, for then he would almost certainly be a lawyer with a lawyer's artificial word-bound conceptions, but, as I imagine him, a sort of cross between Freud and a Yorkshire shepherd, a gentle old soul whose strength lies in his source, the soil, who will blurt out earthy truth.

For instance, I think the public has great need for the understanding of the psychical mechanism of conflict. It accounts for "There is no fury like the fury of the non-combatant," as I once heard a German general say to his host, General Smuts, as well as for the too ready forgiveness of and fraternising with the enemy by combatants—and incidentally much of the recent correspondence in the *Times*. "Ah remember when Ah was a boxing boy ..." our old shepherd might say, and go on to describe how he once knocked a big ugly vicious lad out and as this bully lay on the ground he felt loving towards him and wanted to stroke his hair. But there was another lad with whom he had quarrelled and never fought and they had hated each other for years. Yet in neither attitude had reason any great part and the roots of conflict are left in the ground. The fighters—the minds that go through the emotional rainbow from the red flaming hate to the violet of compassion—are as animalistic as the non-fighters who have not been granted consummation. Our PP will probably quote Kim's Lama here. Finally, "Yes, these man-made catastrophes like war and poverty will be recurrent, almost seasonal, until Man reaches that stage of development when the first light of reason shows him his own circuits and checks, and he stands humble and with dazzled eyes, watching the dawn of Eternal Verity." (O, well timed, Sir, well timed! There goes Big Ben!)

* * *

Many of us have been longing for the day when, no longer restricted by King's Regs. para. 547 (*a*), we can get our unfettered views about Service Medicine off our chests into print. We'll show it up, we mutter between clenched teeth as some fresh humiliation or obstruction is tossed our way. Well, Mr. I. G. Briggs has beaten us to it, and perusal of his lucubrations, *They Gave Me a Crown* (Herbert Jenkins, 15*s*.), will give us all pause. (The chances were, in any case, that once free to walk about hatless with hands in pockets we should have forgotten the Worst Bits and Said Goodbye To All That without publishing a song about it.) Writing a book like this must bring its author considerable cathartic benefit, but it is difficult to see what other useful purpose it can serve except perhaps to deter you and me from a similar public evacuation. In justice it must be stated that Mr. Briggs has no adverse criticism to offer about the RAMC in action; indeed he doesn't mention it at all. His attack is launched against that very vulnerable area—administration. Everyone knows that administrative incomprehensibilities, so often apparently entirely lacking Divine Guidance, drive everybody, brigadiers and GDOs alike, to wild laughter, blasphemy, speechless indignation or shoulder-shrugging acceptance, according to temperament and mood. And that's that. (Mind you I don't go so far as to say that their authors should not be brought to justice; but I do feel that they should be given a chance to lead decent clean useful lives in the future—I mean all those chaps responsible for ACIs, postings, promotions and letting off rockets, don't you think? I expect there will have to be an Aid Society, and provision will have to be made to protect them from blackmail by other ex-War-Office narks. A nice job for our sociological workers.)

Mr. Briggs's experiences are by no means unique: they could all be capped, especially by those of us who have also served as patients. At the outbreak of war he was posted to a military hospital which possessed specialists of every description but no equipment, no beds and no patients, and which preserved this innocuous status for six months. He obtained his majority by the simple expedient of going to the War Office and asking for it (those were the days!). After a fortnight's tuition he was then posted as registrar to a partially converted mental colony containing sick and wounded from Dunkirk, including Frenchmen over whom he had no disciplinary control. His solution of this problem by translating all breaches of discipline into psychoneurological syndromes and treating them all on Weir Mitchell lines brought 100% cures, but got him into trouble with the authorities. Later he became in turn a registrar at a military hospital, a regimental MO, and lastly a GDO at a military hospital. None of the little paper jokes, such as Diet Sheets and the sevenfold Notification of Infectious Diseases, really appealed to him. His views on the future of medicine are provocative.

* * *

Somebody commented the other day that when the flying bombs were endemic in the sky the average citizen looked not drawn with anxiety or suspense but rather more vacant and fatuous than usual. I think I know the reason. Observe a friend listening to a watch. If there is difficulty in hearing the tick a sudden change comes over his face—the jaw drops, the face muscles relax and an expression of saintly idiocy replaces that of ordinary awareness. When a Bell's palsy turned up in outpatients bitterly complaining of the classical hyperacusis, I suddenly saw the connexion. Of course relaxation of the stapedius makes you hear better, whether achieved by voluntary relaxation of all the face muscles or an involuntary palsy of the seventh nerve. This seems so simple and obvious a truth it is odd that neurological textbooks make no comment. Try listening intently for a faint sound (*a*) with a relaxed fatuous expression, (*b*) with any violent grimace and you will see that this is so. Odd that Darwin didn't comment on it in his delightful book, *The Expression of Emotions in Man and Animals*, where he mentions the physical changes associated when the various senses are used. Anyway, even if you aren't convinced, I believe that the placid vacancy of London citizens was due to their relaxing not their vigilance but their stapedius muscles. A dog will prick up its ears to catch a sound. A man will prick down his face.

* * *

I have by now passed through Paris and Brussels, setting up a temporary clinic in each place, and no doubt you will be envying me the experience. But in reality life has been a succession of problems, such as broken Primus stoves, lost equipment and missing orderlies, and the pleasures of continental travel have been submerged by the thought of where the next stock of food, water and petrol was to come from. However, c'est la guerre. * * *

Watching a pre-view of the War Office film, *Our Teeth*, I was struck by the contrast between primitive man's table manners and the modern extraction of teeth under nitrous oxide anæsthesia (with incidental music). The contrast was of course intentional and served to show how our more or less remote ancestors were forced to grind up their food before the advent of Mrs. Beeton and her culinary predecessors. This grinding motion of the jaws was shown to stimulate circulation of the blood and at the same time permit no accumulation of food debris about the teeth and gums—thus, apparently, preventing caries and pyorrhœa, although in fact primitive man was very prone to the latter. The moral for the soldier was, brush your teeth daily and in the proper way and visit your dental officer as regularly

as your military duties will allow if you would keep your teeth for postwar beef steaks. I could not help feeling that this form of propaganda, necessary as it may be at present, is a sad reflection on modern medical science in that both tooth-brushing and dental surgery are only palliatives and provide no means of preventing dental disease. In the film no mention was made of building up a strong set of teeth and jaws by increasing our consumption of foods rich in vitamins and minerals, such foods as the cave-man ate in vast quantities. Even if we do not prefer them all in the raw state, common-sense cooking will conserve most of these elements and without them little progress is likely in spite of all our efforts at oral hygiene.

The Scottish Office has lately developed an admirable tendency to wash its dirty linen in public. Not only does this stimulate public opinion to demand the reforms which, in a democracy, require this stimulus before official action is taken. It also, no doubt, wakes up the local authorities, often the weakest link in the chain of administrative action for improving social conditions. Their latest effort is a 35-minute documentary film, made for them by Miss Budge Cooper and Paul Rotha, working for the Ministry of Information. *Children of the City* is a story of juvenile delinquency; of the environment which causes it; of the work of the juvenile courts, the child-guidance clinic, the probation officer, and the approved school. Three little boys, Robbie aged 10, Duncan aged 13, and Alec the ring-leader aged 13½ are caught rifling a pawnshop; the film tells why they did it, and what happened to them. It should be seen by all who still think the rod is the only cure for the bad boy—and also by everyone who grudges paying his rates.

Letters to the Editor

WOUNDS OF THE BLADDER

SIR,—We agree with Mr. Elliot Smith that it is unfortunate that the surgeon who carries out the primary treatment of the wounded bladder is seldom able to follow his cases to their conclusion. One of our reasons for writing our recent paper on this subject was to complete the picture and more especially, to emphasise the fact that the unfavourable late results so often observed were always attributable to inadequate treatment in the first place. Observations of a not inconsiderable number of wounds of this type from the western theatre of war during the past few months have not caused us to modify the opinions we have already expressed, so we cannot agree with the statement that "in the majority of bladder wounds it is not necessary to close the perforation." Moreover we feel that the arguments of the writer in support of his views are no more watertight than the bladders he is so loath to close.

In the first place he states that the result in case 1 of our series was satisfactory in spite of the fact that the hole in the bladder was not sutured. If he reads the description more carefully he will find the suprapubic tube was inserted *through* the perforation, as this was at a high level and it was considered unnecessary to make another opening for this purpose.

Secondly, he maintains that "adequate suprapubic drainage ... will prevent further leakage from the bladder wound." It is difficult to conceive how any tube, however large, and placed in the centre of a hollow viscus can by siphonage conduct all the urine away from the more dependent parts. The writer can readily prove to himself that the bladder base is not kept dry, by observing the gush of urine which comes from the suprapubic opening whenever he removes a suprapubic tube. It is also unfortunate that the effects of continued leakage of small amounts of infected urine from an unsutured wound of the bladder base are not at once apparent. The ultimate results of this insidious process may not always be appreciated by the surgeon working at the forward area.

Lastly, we cannot share his faith in the ability of the bladder to contract down and seal off any wound. Most bladder wounds seen in war-time are the result of missiles, and are associated with loss of tissue; others are extensive tears caused by the jagged ends of a fractured pelvic girdle. We have recently seen a wound of the latter variety, the gaping edges of which had become firmly attached to the back of the symphysis pubis and has shown no signs of uniting in spite of long suprapubic drainage (case B, below).

Clean incised wounds, such as the bayonet stab he describes, are comparatively rare. We are glad to learn that "self-sealing" occurred in this case, though—obsessed as we are with the unreliability of this mechanism—we should have preferred to have sutured the edges of the bladder wound. To illustrate the importance of immediate closure of the ruptured bladder we would like to describe briefly two of our more recent cases. The nature of the bladder injury was more or less identical (subparietal extra- and intra-peritoneal tears), and the only difference in the primary treatment was the fact that the extraperitoneal tear was sutured in case A but not in Case B. The end-results in the two cases form an interesting comparison.

CASE A.—An able seaman sustained a subcutaneous rupture of the bladder as a result of falling down between the launch he was trying to board and the side of the jetty. At laparotomy an intraperitoneal rupture of the bladder was sutured. There was however an associated extraperitoneal rupture of the bladder, where the fractured ends of the superior ramus of the os pubis on the right side had perforated it. The edges of the extraperitoneal wound were firmly impacted between the two ends of the fractured os pubis. This wound was also sutured and the bladder drained suprapubically. There was no sign of extravesical infection during convalescence, and the patient is passing urine normally, 3 weeks after the accident. We believe that failure to suture the extraperitoneal tear in this patient would have led to severe perivesical cellulitis and osteomyelitis at the site of fracture.

CASE B.—An able seaman was blown across the deck of a ship as a result of a mine explosion and sustained a fracture of the pelvis. The records stated that at the primary operation an intraperitoneal tear of the bladder was sutured, and the bladder and the prevesical space were drained suprapubically. In spite of continued suprapubic drainage a spreading cellulitis of the prevesical space developed, and when the patient was first seen by one of us two months later, the suprapubic wound had broken down and the perivesical tissues had become converted into a cement-like mass which completely surrounded the bladder. A finger passed into the bladder through the suprapubic fistula revealed the fact that the entire anterior wall of the bladder was absent, the edges of the bladder wound being firmly adherent to the back of the symphysis. It was obvious that a large extraperitoneal tear of the bladder had remained unsutured. Radiographic examination showed that the condition was further complicated by osteomyelitis of the fractured pubic rami, and a commencing infective arthritis of the left hip-joint. Further treatment of this case both from the genito-urinary and orthopædic point of view is likely to be long and difficult.

R. A. MOGG. J. G. SANDREY.

GROWTH AT HOME AND AT SCHOOL

SIR,—I should like to emphasise the importance to all students of school nutrition of the article by Widdowson and McCance in *The Lancet* of July 29 (p. 152). Whether or not we agree with the authors' conclusions, we must admit that they have discovered a school which can (*a*) under competitive economic plus war conditions maintain a diet with which even a mother could find no fault; and (*b*) attain satisfactory standards of mental and physical education such as would satisfy the head master and the educated male parent, without imposing any temporary checks on the growth of the scholars.

If food is the only factor involved one could predict a uniform rate of growth in all the schools in the alphabet if the "Z" diet was applied to them all. For this it will be necessary for the authors to publish one further item of information, which can be revealed without prejudice—the dietary followed in the satisfactory school. On the other hand, if optimum diet is not the entire solution, one could re-examine the alternative factor, educational pressure, with some certainty of its existence and with a view to deciding whether it is necessary in order to obtain results, and, if necessary, whether it does any permanent harm to physical and mental development and the formation of character. It may be relevant that one group of well-nourished London schoolchildren showed an increase beyond prediction in height, and still more in weight, during a period of enforced relaxation from all educational pressure for three to six months after evacuation (Cheesman, J. E. *Lancet*, 1940, ii, 575).

Petts Wood, Kent. J. E. CHEESMAN.

BACK FROM THE WARS

SIR,—The views expressed by Surgeon Lieutenant RNVR in your issue of Sept. 9 will meet with a great deal of agreement even among the civilians he castigates. A word might well be spared, however, in defence of those who have remained in plain clothes despite their own wishes.

Many who qualified during the "phoney" war of 1939–40, or who failed to get into the Services at that time, found themselves doing quite good work during the Battle of Britain and the subsequent blitz. During this period some quite properly became junior specialists, and as they filled posts for which no-one else could be found they have perforce remained outside the charmed circle of the Forces. Moreover, such EMS appointments are not infrequently in the remoter areas of the country, where the recent graduate, the pure milk of his alma mater scarce dry upon his lips, finds his pristine enthusiasm sorely damped. If under such circumstances he succeeds in gaining a higher qualification—and he is usually worked hard enough in all conscience—should his initiative be held against him?

The pity of it is, of course, that the opportunity of combining the EMS and the uniformed medical services was missed. Nevertheless, may I suggest that justice may still be done, even at this eleventh hour, both to the civilian who would prefer to be a soldier, and to the not-so-rare individual who has taken care that he is nothing of the sort? As soon as the German war ends, a wide interchange of Service and civilian doctors should be arranged, especially of those in hospital posts, both honorary and salaried. Not only would the Surgeon Lieutenant's perturbation as to his future be eliminated, but a much larger number of efficient doctors than we can at present hope to see would be available after the war.

RUSTICATED.

THE FAMINE IN BENGAL

SIR,—I could wish that your correspondent (Sept. 2, p. 322) had said more about the causes of the famine. Two important factors have not perhaps been sufficiently stressed:—

> (1) Crops in a large part of the province were not markedly short; but, when the rice was threshed, it lay in the villages, for none of the dealers' agents came to buy and remove the grain. These middlemen (marwaris) at the first raids and threat of Japanese invasion had been infected by panic in Calcutta and removed themselves hastily to their homes westwards from Bengal. For this age-old custom—village purchase and cartage—there was no substitute scheme in readiness.
>
> (2) Everyone knew—although the press could not refer to it—that a main railway-line into Calcutta from the north-west was destroyed at a time when it would have served to bring in grain from areas of India where there was a surplus. This railway failure, a real catastrophe, resulted not from an ordinary flood but from a long-prophesied change in the river course. The channel, like that of the Yellow River, had for years been raised by its silt. The river burst into a new area, washing away the railway for some 60 miles. Some years ago the provincial engineers had submitted plans in prevision, but the government decided that the costs would be too heavy and voted instead for levees (bunds) "sufficient for the day."

Information from those familiar with Bengal conditions might be forthcoming on three further factors:—

> Was the 1943 rainfall much below average in Bengal? At what month did the shortage appear and what was the monthly distribution as compared with (say) the previous 50 years?
>
> In normal years to what extent did Bengal depend on Burma for rice? Possibly less than is generally assumed.
>
> Was Bengal in 1943 allocating more land than usual for export crops (other than food) in support of the war's demands?

When the Hoogli delta was devastated some 70 years ago by a tidal wave, no provision could have been made in advance, and few lessons were to be learned therefrom. But the 1943 famine was not this sort of a catastrophe, Nor is it to be classed with the 1943 famine in China, where the long-prevailing war conditions rendered prevention and relief alike impossible.

When famine or other emergency presenting insoluble problems to the nutritionist and epidemiologist arises from specific causes which governing bodies with their technical advisers might, at least in part, have forestalled at their leisure, it is surely an occasion when the hygienist may offer comment, though conscious of his ignorance of some of the many factors involved. And how few know them all? When one considers that famine and chronic subnutrition follow not only from vagaries of climate (acting either acutely by days of flood, or slowly by months of drought or years of soil erosion) but also from native social customs leading to relative over-population or to over-stocking with cattle (as in Africa), or ignorance leading to deforestation (as in China), or superstition as to fertilisers, or greed resulting in hoarding or currency inflation, the hygienist realises that parasitic disease (malaria, hookworm, trypanosomiasis) is but one among many groups of factors at work. And it is his business to search widely and disregard none; for, from the acute mass disaster of famine properly studied, he may learn of hitherto unconsidered origins for a prevalence subnutrition.

Public bodies faced with the sudden acute menace of famine will usually afford the medical administration any needful, albeit belated, support, while information regarding the various causal factors will be of interest to everyone. It is otherwise when it comes to evaluation of all the conditions leading up to chronic malnutrition in a given population. Such are as yet of interest to special circles only, and the response from public bodies is commonly small and indicative of divergent views. All the causes contributing to the Bengal famine of 1943 should continue to furnish a field for intensive study.

A. H. SKINNER.

*** The white-paper on the Indian Food Situation published a year ago (Cmd. 6479) summarises the causes as follows. "In 1942–3 Bengal, with its 60 million population, ... was faced with a double calamity. The normal net imports of rice of about 135,000 tons were lost with the fall of Burma, and the main winter rice crop was both damaged by disease and devastation in certainly heavily producing districts by cyclone which swept the east coast of India in October, 1942. The 1942–3 Bengal rice crop was estimated at about 7 million tons, against a normal of 8·1 million tons which, with the lost imports, left a gap of about 1·2 million tons in domestic rice supply. While this was the statistical deficit the supplies available in the markets had shrunk to an even greater extent as a result of the shock to the public caused by events in Burma and air-raids on Calcutta. This led to hoarding by cultivators, traders and consumers, and a steep rise in the price of rice to more than ten times the prewar level. The general state of apprehension was aggravated by measures of military necessity such as removal of stocks of food from danger areas (though the total quantity involved was less than 40,000 tons) and of boats which are practically the only means of transport in the coastal districts. Difficulties of transport were not lessened by the Damodar floods which later in 1943 breached the main railway line to Bengal."—ED. L.

TROPIC OR TROPHIC?

SIR,—The use of the terms *gonadotropic* and *gonadotrophic* to designate pituitary and other hormones with a specific influence on the gonads has been as clearly divided between American and British scientific authors as that of *gasoline* and *petrol* between the general public of the two nations. Most writers felt, or at least expressed, no concern about this difference; it was accepted as are most peculiarities of the British and American styles of writing. But in a recent article in *Endocrinology*[1] G. W. Corner, Sr., pleads for the adoption of *gonadotrophic*, and since this question is not the private affair of a few American endocrinologists, it seems apposite not to limit its discussion to a single publication. Especially if the cause of *gonadotropic* is to be defended, a statement of its merits might as well be addressed to those who are used to the word with the *ph*.

1. *Endocrinology*, 1943, **33**, 405.

The cardinal question to be answered is which of the Greek words *trepein* or *trephein* is the more descriptive of the substances to which they refer. The word τρέπειν (trepein), as pointed out by Corner, means *turn toward*, and secondarily *change*—the latter, however, essentially with the meaning of a change in direction. The most adequate translation would perhaps be *aim at*. The word *gonadotropic* does not contain any definite implication as to active or passive, nor subject or object, form of its components. However, the analogy with other words containing the verb *trepein*, and also its use as an adjective to substance, make it quite clear that it means the qualification of the noun, a substance, as aiming at the gonads, the latter being the object or the end-organ of its action. This is in keeping with the traditional use of similar words, as a *heliotropic* plant is a plant turning towards the sun, or *neurotropic* poison a poison acting preferentially on the nervous system.

Corner cites in support of his preference a criticism presented by J. H. Burn [2] as follows: "Thyrotropic hormone means one which is attracted to the thyroid in response to a stimulus exerted by the thyroid." This gives *trepein* a meaning which is quite artificial. If a soldier turns his gun, aiming it at an enemy, which action is exactly *trepein*, it would sound rather absurd to claim that the enemy attracted the aiming soldier. He is not made to turn but is quite active about it. There is no reason to assume that *trepein* is used in the passive form. Ehrlich in his differentiation of organotropic versus bacteriotropic potency of therapeutic substances certainly considered the substances under investigation as acting, damaging to be sure, but not as being attracted. Of course, it is admissible to say that the earth is attracted by the apple and not vice versa, which is theoretically true but not in harmony with the common way of looking at it.

There is no conceivable objection to the word *tropic*, because its meaning is as wide and general as it possibly can be; it establishes the activity of a substance as directed towards an organ, without qualifying this action in any way, and, in view of our still rudimentary knowledge of the character of hormonic stimulation, a conservative expression kept as general as possible remains absolutely commendable. *Tropic* even includes in its meaning inhibiting hormones, the existence of which has been postulated and some day may be proven.

The word τρέφειν (trephein) has the primary meaning of *nourish*, *nurse*, secondarily *nurture*, and consequently *make grow*. Regardless of whether we choose arbitrarily the word *nurture*, as recommended by Corner, or any other translation, the idea of alimentation rests with the Greek word. In that respect, the nourishing blood-stream would have the first claim to be trophic. To say that the stimulating hormones are nutrients to the end-organ means decidedly going into a debatable field of our present knowledge, and is contrary to certain observations, especially if growth is considered as the outstanding result.

The first effect of some hormones is the accumulation of water in the tissues, which is not identical with growth. Small doses of pituitary gonadotropin cause an initial shrinkage of the ovary of the immature rat. How could it be the effect of a "growth-producing nourishment"? In one of your editorials on the placenta as an endocrine organ we find the following sentence: "Though it acts on the ovaries of test animals in various ways, thereby earning the title 'gonadotrophic' or at least 'gonadotropic,' the results of experiments to find its action on the primate ovary are disappointing." [3] The writer here acknowledges that *gonadotropic* is the more general term, and apparently wishes to apply *gonadotrophic* more to that hormone which naturally takes care of the function and development of the gonad. Taking this latter idea seriously, we shall have to wait for some distant future before we can use the word *gonadotrophic*, because at present we cannot be sure that even our purest preparations are not in some way changed chemically, no longer representing the natural hormone. Perhaps they are artefacts, which should rather range in the same category as the chorionic products. For the time being it appears preferable to use the undescriptive *tropic*, which does not carry any commitment.

Brooklyn, N.Y. A. E. MEYER.

2. Biological Standardisation, London, 1937, p. 162.
3. *Lancet*, 1943, i, 592.

On Active Service

CASUALTIES

MISSING, PRESUMED KILLED

Surgeon Lieutenant RICHARD LESLIE HALL, MRCS, RNVR

WOUNDED

Lieutenant W. A. COOPER, RAMC
Captain, P. J. R. DELLER, MB CAMB., RAMC
Captain A. A. GREGORY-DEAN, RAMC
Captain J. T. A. LLOYD, MB MANC., RAMC
Captain E. W. MOORE, MB BRIST., RAMC
Captain R. S. SMITH, RAMC

Public Health

Vital Statistics of the USA

IN 1900 the United States Census Bureau published its first annual report of vital statistics. It was based on mortality data from only ten states and a number of cities. Year by year this area has been widened and the available data have become both more extensive and more detailed. Since 1933 statistics of births and deaths have come from the USA as a whole, and, finally, with the census of 1940, the country has for the first time national vital statistical data and the corresponding population figures necessary for their analysis. These 40 years, in which the foundation of the national system was being laid, have seen an increasing recognition of the value of mortality and natality rates in public-health work, and related social spheres. As the use of such quantitative material is likely to grow, the bureau decided to bring together in the compass of a single volume the trends of the more important mortality and natality rates from 1900 to 1940, and their status at the latter date. These years will undoubtedly form the base line in relation to future changes and their various indices denote the present problems worthy of study and demanding attention by public-health workers. Though the war has severely limited the original plans of the bureau it has been able to publish a useful compilation of the main statistical data.[1] These include rates of mortality, general, maternal, in infancy and by stillbirths, in relation to such features as area, month of the year, age, sex, cause of death and race; birth-rates by age of mother, birth order, race, month and other factors; and numerous population tables. Not the least valuable part of the volume are some lucid introductory chapters on the general problems of classifying, tabulating, calculating and interpreting vital statistical data and rates. It should be a valuable book of reference particularly, but certainly not only, to the worker in the USA.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 16

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1591; whooping-cough, 1083; diphtheria, 541; paratyphoid, 8; typhoid, 5; measles (excluding rubella), 1155; pneumonia (primary or influenzal), 291; puerperal pyrexia, 130; cerebrospinal fever, 37; poliomyelitis, 14; polio-encephalitis, 2; encephalitis lethargica, 0; dysentery, 351; ophthalmia neonatorum, 71. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 13 was 670. During the previous week the following cases were admitted: scarlet fever, 26; diphtheria, 16; measles, 11; whooping-cough, 27.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 1 (0) from measles, 10 (4) from whooping-cough, 12 (0) from diphtheria, 91 (7) from diarrhœa and enteritis under two years, and 11 (0) from influenza. The figures in parentheses are those for London itself.

Nottingham reported 9 deaths from diarrhœa, West Bromwich and Poole each 5. In the same week Glasgow had 32 fatal cases.

The number of stillbirths notified during the week was 191 (corresponding to a rate of 29 per thousand total births), including 15 in London.

1. Vital Statistics Rates in the United States, 1900–1940. Forrest E. Linder and Robert D. Grove, U.S. Dept. of Commerce, Bureau of the Census. U.S. Govt. Printing Office. Pp. 1051. $1·75.

Obituary

LEWIS SMITH

M D LOND., F R C P

Dr. L. A. Smith took little part in the affairs of the profession. But as teacher and physician he was held in affection at the London Hospital, and his qualities of heart and mind brought him a large consulting practice.

Born in Chelmsford in 1869 he entered the London at the age of 20 and qualified at 26. A comprehensive series of house-appointments followed, and in 1901, having served as medical registrar, he qualified for the London MD gold medal. After his election as assistant physician in 1902 he held for many years appointments in the medical college as demonstrator of morbid anatomy and teacher of elementary clinical medicine. His vitality, sympathy and good sense made him unusually helpful to students. Apart from contributions to Allchin's *Medicine* and Hutchison's *Index of Treatment*, he wrote little on medical subjects; he undertook no original research and delivered no public lectures. But he was in fact a very able man, with exceptional capacity for expression both in speech and in writing. His handicap was the lack of a good education, both in early life and later at the London where professional instruction (apart from practical clinical experience) in those days too often used the methods of the crammer. Recalling educational conditions at this time R. C. B. W. writes:—

The medical college was in the transition period which followed the Medical Act of 1886. It was still a proprietary college belonging to the staff of which the profit was divided among the proprietors and looked upon them as partial remuneration for their services on the honorary staff of the hospital. Most of the teaching at the college was given by members of the staff.

The college was not endowed; its income was derived wholly from students' fees. After 1886 the requirements of medical education increased and the expenses of the college steadily reduced the surplus available for payment of the staff. Expenses were cut wherever possible and aid was sought. The hospital made a grant to the college in return for the services of the students as clerks, dressers and housemen, but even so the demand for improved teaching at the college was inexorable and resulted in 1895 in the appointment of Keith and Hill to teach anatomy and physiology whole-time, and shortly afterwards (1897) Bulloch as bacteriologist.

"L. A." was at the college at the time when Openshaw taught anatomy and Moullin physiology on a part-time basis. Sequeira and Langdon-Down demonstrated anatomy and Dawson and Brodie physiology. Page was the only whole-timer, teaching chemistry, physics and any allied subject. There was no organised clinical laboratory until Panton was appointed in 1909. Until then the so-called lab was run by the registrars.

Early training and perhaps *res angusta domi* led Lewis Smith to devote most of his energies, outside hospital, to the development of his practice, and with Treves's help it prospered. "Those were the days when consultations in typhoid fever alone sufficed to pay household expenses." Though his approach to medicine was based rather on other people's observations than on his own, he was an excellent clinician—one of the dwindling company of general physicians who can look at the whole patient; one of those who, called as the *n*th opinion, can correctly diagnose a leaking ectopic or something equally outside the scope of general medicine. That his success depended in some measure on bluff he would have been the last to deny, but what he lacked in erudition was compensated by thoroughness and understanding. In the wards he gave encouragement to patient and student alike. "This work is not worthy of the high standard I have learnt to expect from you" was his tactful and usually effective way of reproving a slovenly clerk. And he had a way of telling the patient he was better which really made him feel that he was. "It may not be given to every practitioner," he once wrote, "to possess the personality which appeals to the sick man, but he should cultivate those lesser graces which reassure the invalid."

"L. A." entered the London Hospital in the same year as Hugh Rigby and Russell Andrews, and they were contemporaries on the house and on the staff. A close friendship was maintained throughout their lives, all of which have recently ended. As students they were all in the rugger team and later they had the same hobbies of golf, shooting and fishing. The last he loved especially. In *The Lancet* of 1938, writing as the Silver Doctor, he said:

"I have played many games, revelled in a variety of outdoor sport, but first, last, and all the time I have been a fisherman. ... Never shall I forget my first fishing at the ripe age of seven, nor the pride with which I carried home four small perch wrapped in water-lily leaves ... I recall wadings and waiting for Scottish salmon, long happy days of trout-fishing, sunrises after Thames chub, evenings among Avon roach, dappings on Irish loughs, pike-spinning in every variety of water and weather, fly-fishing for the great rainbows of New Zealand and Canada, and long days among Pacific rollers in search of deep-sea monsters."

Retirement gave him leisure for travel both at home and abroad. He had married Sir Hugh Rigby's sister but they had no children. Some years back he had a slight cerebral hæmorrhage, and latterly he was troubled by arthritis. But a month or two ago he could still write characteristically from his Criccieth home "I still enjoy every hour of my life."

DENNIS EMBLETON

M B CAMB.

Dr. Dennis Embleton died suddenly on Sept. 17 at Ashridge Hospital, Berkhamsted, where for the last four years he had been in charge of the bacteriological laboratories. He was born in 1881, son of Dennis Cawood Embleton, and grandson of the Dennis Embleton who held the chairs of physiology and physic at Durham University and was the nestor and historian of the young Newcastle medical school. His father, who left Newcastle to qualify at UCH and later practised in Bournemouth, was living in Madeira when Dennis was born and died while he was still at school. Under the guardianship of Sir Victor Horsley the son was educated at Tonbridge School and Christ's College, Cambridge, where he gained a place in the Cambridge water polo team. He graduated through the natural sciences tripos in 1904 and qualified in medicine from UCH two years later. His interest was then aroused by Sir Almroth Wright's work on the mechanism of immunity and he was drawn to the study of bacterial disease. In 1907 he was appointed assistant pathologist to UCH, and soon after became demonstrator in pathology and in 1912 assistant lecturer in bacteriology in the school. Those were years of fruitful activity with F. H. Thiele on the virulence of bacteria and the nature of antigens, with important reference to the Wassermann and similar reactions. In 1914 he joined the RAMC and served first at the 3rd London General Hospital, but he was soon transferred to Netley, where he did excellent work on the carrier problem in cerebrospinal fever. After the war Embleton established himself as a bacteriological and pathological consultant, and soon built up a large practice. Latterly he had been working on the relation of glycosuria to obesity and high blood-pressure, and he published papers on the importance of glucose-tolerance curves in life assurance. A few months ago he became senior lecturer in bacteriology at UCH.

Embleton, writes a friend, was a man of handsome appearance and exceptional stature—he was over six and a half foot—but he had the modest demeanour which so often accompanies these attributes. A good and painstaking teacher and a sound consultant he was popular alike with students and colleagues, and his fellow bacteriologists selected him as their representative on the Central Medical War Committee. His life was a busy one, but he always found time for gardening, and when he was left an estate in the North Riding he developed the gardens into a beautiful example of horticulture, largely the work of his own muscles and those of his family. He married Alys Faraday Boyd, and they had a daughter and a son, now a medical student, who will be the fourth generation of doctors in the family.

OWEN ALFRED ROWLAND BERKELEY-HILL

M D OXFD; LIEUT-COLONEL IMS RETD.

Colonel Owen Berkeley-Hill, whose death in India is reported, was for many years medical superintendent of the European Mental Hospital at Ranchi. He was a son of Berkeley Hill, senior surgeon to University College Hospital, was born in 1879 and was educated at Rugby and Trinity College, Oxford, studying also for a time at Bonn and Nancy before entering his father's hospital as a student. After qualification in 1905 he gained first place in the entrance examination of the IMS two years later. Even as a student he displayed the brilliant wit and impish delight in criticism that subsequently made him famous. His originality took many forms: "at various times," a correspondent of the *Times* recalls, "he was a dress reformer (shorts and short-sleeved shirt), a diet reformer (one meal a day), education reformer (particularly in regard to medical education), and always a critic of officialdom." His private war against red tape during the East African campaign of the last war is recorded in his autobiography *All Too Human* (1939), which does not however do him full justice. In person even more than on paper he was an admirable raconteur; and after establishing a reputation on board ship by his truly encyclopædic knowledge he would explain to admirers that it was a simple matter to borrow a volume of the *Britannica* each day and then steer conversation towards the appropriate letter of the alphabet.

Berkeley-Hill's unconventionality and daring concealed from many a sensitive and penetrating mind. He did pioneer work at Ranchi, where after a fight with bureaucracy he was entrusted with the planning and inauguration of his hospital. Built on the pavilion system, with large grounds and generous staffing, it was the first of its kind in India, and he used his gifts successfully in its service, which continued till his retirement from the IMS. For a time thereafter he lived in this country; but later he returned to Ranchi with his wife, an Indian lady, and conducted a private home for mental patients. His son, an RAF pilot, was killed in the defence of Malta two years ago.

GUY FOSTER BARHAM

M D CAMB.

Dr. Barham, who had spent a long life in serving LCC mental hospitals, died at Gorran Haven on Aug. 30. Youngest son of Foster and Elizabeth (née Jevons) Barham, he was born at Bridgwater, educated at Blundell's, Fettes, and Caius College, Cambridge, where he took the tripos and went on to the London Hospital for clinical study. Qualifying in 1901 he held house appointments before joining the staff of Claybury Hospital where under Armstrong-Jones he found his consuming interest in psychological medicine. In 1907 he transferred to the newly opened Long Grove Hospital as deputy to (Sir) Hubert Bond, with care of the women's division of 1100 beds. Those were still days when the means of physical investigation were limited and the influence of Freud was dominant, and Barham while never losing his foothold in the bodily organism as a whole was attracted to psychotherapy and wrote his MD thesis on emotional conflicts. It was here that he enjoyed stimulating staff contact with such men as Mapother, Bernard Hart, H. L. McCarthy, Geoffrey Clarke, Henry Devine and Thomas Beaton. After ten years he returned as chief to Claybury, to initiate many improvements, most noteworthy the erection of Forrest House to segregate early and sensitive cases, and to advance the status and training of mental nurses. He sat on the departmental committee of 1922–24 and with H. Wolseley-Lewis put through the scheme of preliminary training schools, of which Claybury was the first example in London.

An accomplished physician in the true sense of the words, writes H. B., Barham was of artistic temperament and had a fastidiousness of taste which led him always to seek the best. A certain tidiness of mind characterised his work. These attributes were reflected too in his bearing and person, and gave the impression—which indeed was true—of one able to bear responsibility and to direct. They were no mean assets in the control and administration of a hospital with 2300 beds and a staff of 500, and in the handling of patients whose long illness tended to neglect of person and deterioration of habit. In no other mental hospital were the wards kept so attractive in appearance by arrangement of pictures and other cultural objects. Barham's hobbies were mountaineering and latterly gardening. It was on one of his climbing tours that he met Germaine Ceresole, daughter of a former president of the Swiss Confederation, who became his wife in 1911. She survives him with three daughters and a son, now serving with an aircraft carrier.

Notes and News

MEDICAL SERVICES IN LIBERATED AREAS OF USSR

Cable received by the Anglo-Soviet Medical Council from Dr. PAUL IGNATYEV

THE Soviet Government has set aside considerable sums for the restoration of medical institutions in areas liberated from the Germans. In such areas up to 70% of prewar medical facilities have already been restored. Some 12,500 medical workers have been sent to them, and of the doctors qualifying this year 1000 are being sent to the Ukraine and Byelorussia alone. In addition groups of specialists are sent to the liberated areas to aid the local health authorities. Red Cross sanitary and anti-epidemic squads are functioning in many of them. Medical supplies to the value of millions of roubles, including hundreds of tons of medicines and disinfectants, linen and bandaging materials have been sent by the People's Commissariat of the Health of the USSR.

Special attention has been paid to the medical services for children. Twenty-six special children's homes have been opened in the liberated areas, and the majority of children's creches, health centres for mother and child, maternity homes and milk kitchens have been reopened.

Restoration of arrangements for the prevention and treatment of tuberculosis is well under way, and 164 tuberculosis dispensaries are being opened in the Ukraine. Steps have been taken to accommodate in hospitals and sanatoriums more than 10,000 tuberculous patients, and special dining-rooms have been opened for 6000 Ukrainian children suffering from tuberculosis.

The medical institutes have been restored in Byelorussia, Kiev, Kharkov, Dniepropetrovsk and Stalino, and the pharmacy institutes in Dniepropetrovsk and Kharkov. All these have been provided with professors and lecturers as well as school supplies and equipment.

HANDICAP OF IMPERSONAL UPBRINGING

LAST week we considered the prospects of the 80,000 or more children who are being brought up in residential homes, and the new and rather terrifying problem of the unwanted or deserted evacuee. As a training for life hardly anyone is willing to say a kind word for an "institution," but it must in fairness be said that examples of its "deadening atmosphere" or worse make better news stories than the nameless and unremembered acts of the children who become useful citizens. So it is a sensible move on the part of the Nuffield Provincial Hospitals Trust to finance a follow-up of such children and to ascertain in measurable data what is the handicap of the institution child. The grant which is substantial is to be administered by the Provisional National Council for Mental Health; the organisation and direction of the research will be in the hands of Dr. F. H. Bodman, acting director of the Bristol child guidance clinic, who, as our readers may recall,[1] has had large experience of the output of various kinds of homes and "homes."

1. *Lancet*, 1941, ii, 572.

"... the present war is a global war, and we shall require other varieties of military surgery—a resurrection of Flanders surgery perhaps, Balkan surgery, jungle surgery, coral island surgery, Arctic and Mongolian surgery. ... The surgical needs of a campaign may be deduced from the recorded geography of the terrain over which it is to be fought, and from the contemporary trend of battle tactics."—IAN AIRD, *Edinb. med. J.* April, 1944, p. 166.

NEW HOUSES

EVERYONE interested in housing should secure a copy of the *Housing Manual* just issued by the Ministry of Health and the Ministry of Works (HM Stationery Office. Pp. 104. 2*s*.). Attractively written and printed, it sets out briefly the main problems of those who design houses either singly or in groups; and if local authorities accept the guidance given there will be more home comfort and fewer eyesores. The needs of occupants and neighbours are alike considered in discussing the form of houses, and a great number of photographs, drawings and plans enliven the text. A small section is devoted to various types of factory-made equipment, such as the "composite heat unit" and the "kitchen-bathroom unit." A circular commending the *Manual* to local authorities states that the Minister of Health is now ready to entertain applications for the approval of layouts and house plans for sites which have been agreed with the regional planning officer and which the local authority have it in mind to utilise for the first instalment. As soon as the war situation permits the Minister will inform the authority of the number of houses for which they can be authorised to obtain tenders in the first instance.

University of Liverpool

At recent examinations the following were successful:

FINAL EXAMINATION FOR MB, CH B.

Part I.—Cécile N. Broster, G. B. Brown, J. H. E. Carmichael, P. Hampson, Vivien P. Helme, Maureen M. Hoey, D. T. L. Hughes, J. C. Humber, G. C. Hunter, Olive R. Rodgers, L. Rosenbloom, K. S. Shaw and D. R. Wallace-Jones.

Part II.—M. M. I. el Haddad, P. R. B. Jones and R. D. B. Williams.

University of Sheffield

At recent examinations the following were successful:

MD

Frank Ellis (with distinction) and P. M. Inman.

FINAL EXAMINATION FOR MB, CH B

Parts I and II.—Marjorie Hallatt, M. H. Oliver, L. L. Ralph and W. J. W. Sharrard (with second-class honours); Isabella M. Almond, B. R. Eaton, D. P. Greaves, G. K. E. Inman, J. W. Laws, J. D. Simpson and D. R. Thompson.

University of London

Dr. Frank Goldby, Elder professor of anatomy in the University of Adelaide, has been appointed to the university chair of anatomy at St. Mary's Hospital medical school. He hopes to take up his post during the 1945 session.

Dr. Goldby, who is 41 years of age, was educated at Mercers' School, Holborn, and Gonville and Caius College, Cambridge. He took the conjoint qualification at King's College Hospital in 1926 and, after holding resident appointments there, he obtained the MRCP and his MB Camb., and was appointed assistant clinical pathologist to the hospital in 1929. Two years later he became senior demonstrator in anatomy at University College and the next year lecturer in charge of the anatomy department at Hong-Kong. In 1934 he returned to this country as lecturer in anatomy at the University of Cambridge and was elected a fellow of Queens' College. He took his MD in 1936 and the following year he was appointed to his present chair. Dr. Goldby has written papers on embryology and the comparative anatomy and pathology of the nervous system.

Royal Society of Medicine Building Fund

The society is appealing to its fellows for £50,000 to enlarge the premises at 1, Wimpole Street, London, W.1. The number of fellows is now three times what it was in 1910 when the house was built, and the society's work is likely to expand. The proposed alterations, plans of which are on view in the secretary's office, will provide: (1) a new top floor, to contain a large room fully equipped for the examination of clinical cases; (2) an additional spacious library on the second floor, approximately equal in accommodation to the present library on the first floor; (3) a third meeting room on the third floor, which can be used for discussions after clinical meetings; and (4) improved common-room and committee-room accommodation. The appeal is made "not only with the full realisation of the difficulties which are common to all in the medical profession, but also in the confidence that the Royal Society of Medicine can have a brilliant future, in accordance with its past traditions, if the accommodation and requirements necessary for this can be secured without being hampered by a building debt."

Welsh National School of Medicine

Prof. W. E. le Gros Clark, FRS, will give the opening address to students on Tuesday, Oct. 3, in the medical school at Cardiff.

Society of Public Analysts and other Analytical Chemists

The inaugural meeting of the microchemical group will be held on Wednesday, Oct. 4, at 2.15 PM, in the rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1. At 3 PM Miss Janet Matthews, FRIC, will give an address on the development of micro methods in analytical chemistry, and afterwards at a meeting of the society Mr. A. A. Houghton, PH D, will speak on the micro-determination of carbon by wet combustion.

Medical Superintendents Society

A meeting of the council will be held at the Queen's Hotel, Birmingham, on Saturday, Oct. 14, at 2.30 PM, and Sunday, Oct. 15, at 10 AM.

A case of blepharitis and dermatitis affecting the face, fingers and genitalia is reported in a doctor responsible for preparing and administering penicillin solutions at a US military hospital (*J. Amer. med. Ass.* July 29, 1944, p. 903). Patch-tests showed that the dermatitis was produced by the penicillin itself.

Appointments

MASSER, A. A., MB LEEDS: examining factory surgeon for Penistone, Yorks.

STEIN, G. E., MB CAMB.: resident surgical registrar, Three Counties Hospital, Arlesey, Beds.

Births, Marriages and Deaths

BIRTHS

BERNARD.—On Sept. 16, at Clifton, Bristol, the wife of Dr. E. C. Bernard, of Fishponds, Bristol—a daughter.

BISSET.—On Sept. 13, at Weybridge, Surrey, the wife of Captain G. M. Fraser Bisset, RAMC—a daughter.

CAMPBELL.—On Sept. 13, at Rotherham, the wife of Surgeon Lieut.-Commander Patrick Graham Campbell, RNVR—a son.

ELLIS.—On Sept. 20, at Clifton, Bristol, the wife of Surgeon Lieut.-Commander W. T. Ellis, RNVR—a son.

FRAZER.—On Sept. 16, at Freshwater Bay, I.o.W., the wife of Major Simon Frazer, RAMC—a son.

GAY FRENCH.—On Sept. 16, at Bognor Regis, the wife of Surgeon Lieut.-Commander S. Gay French, FRCS, RN—a daughter.

HARDWICK.—On Sept. 22, at Dorking, Surrey, the wife of Wing-Commander Christopher Hardwick, MD—a son.

MACLELLAN.—On Sept. 19, in London, the wife of Mr. Edward MacLellan, FRCS—a daughter.

PERKINS.—On Sept. 20, the wife of Dr. Philip Perkins, of Boverton, Llantwit Major—a son.

RUSHTON.—On Sept. 20, at Cambridge, the wife of Major P. C. Rushton, RAMC—a son.

SOUTAR.—On Sept. 14, at Dundee, to Dr. Margaret Soutar (née Darling), wife of Mr. Stanley Soutar, FRCSE—a son.

TAIT.—On Sept. 22, at Windsor, the wife of Mr. Charles Tait, DOMS—a son.

WARD.—On Sept. 17, at Sherborne, the wife of Surgeon Lieut.-Commander F. G. Ward—a daughter.

MARRIAGES

DYSON—BURNETT.—On Sept. 16, in London, William George Peacock Dyson, captain RAMC, to Mary Gailey Burnett.

JEFFERY—BARHAM.—On Sept. 21 at Shortlands, Cyril Cole Jeffery, FRCS, surgeon lieut.-commander RNVR, to Joyce Marion Barham, QARNNSR.

WALKER—PIGGOTT.—On Sept. 22, Kenneth Walker, FRCS, to Mary Piggott.

DEATHS

BOYD.—On Aug. 15, at Calcutta, Quentin Douglas Boyd, MB ST. AND., Friends' Ambulance Unit, China section, aged 28.

BRISCOE.—On Sept. 15, at Majuba Hill, Natal, John Edward Briscoe, DSO, MC, MRCS, RAMC, aged 78.

CALVERT.—On Sept. 20, John Telfer Calvert, CIE, MB LOND., FRCP, lieut.-colonel IMS retd. late principal and professor of medicine, Medical College, Calcutta.

EMBLETON.—On Sept. 17, at Berkhamsted, Dennis Embleton, MB CAMB., of Richmond, Yorks, and Wimpole Street, W.1.

FASNACHT.—On Sept. 15, at Cambridge, Edward Reymond Fasnacht, MRCS, aged 77.

LEEBODY.—On Sept. 19, in London, Henry Alfred Leebody, MB EDIN., late colonel ADMS, Scottish Command, aged 74.

MOWLL.—On Sept. 20, at Surbiton, Richard Rothwell Mowll, MD LOND., aged 70.

ROLLESTON.—On Sept. 24, at Haslemere, Surrey, Sir Humphry Rolleston, Bt, GCVO, KCB, MD CAMB., FRCP.

DE STEIGER.—On Sept. 23, at Guildford, Adèle Isabella de Steiger MD LOND., of Clarendon Road, W.11.

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References: Jour. of Mental Science, Jan. 1941; Jour. of Mental Science, Jan. 1942; Practitioner, Sept. 1942.

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This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, bio-chemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

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Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

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Illustrated Brochure on application to the Medical Superintendent, The Old Manor, Salisbury.

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Notice is hereby given that the next Primary and Final Examinations for the Diploma of Fellow will commence on MONDAY, 23RD OCTOBER, and THURSDAY, 2ND NOVEMBER, respectively.

Candidates who have fulfilled the necessary conditions, and who desire to present themselves for examination, must give notice in writing to the Director of Examinations, Examination Hall, 8–11, Queen-square, London, W.C.1, at least 21 days before the date of the Examination, transmitting at the same time such certificates as may be required by the regulations together with the amount of the fee due. Primary: Each Admission, £8 8s.; Final: Each Admission, £15 15s.

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All medical students and others interested will be welcomed.

EXAMINING SURGEONS: Factories Act, 1937. The following appointment as Examining Surgeon under the Factories Act, 1937, is vacant. Applications should be sent to the Chief Inspector of Factories, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of application*
CONISTON ..	LANCASTER ..	9TH OCTOBER, 1944

THE PRINCE OF WALES'S GENERAL HOSPITAL, London, N.15. Applications are invited for the appointments of HONORARY CLINICAL ASSISTANTS for the year 1945 in the following Departments of the Hospital:—

Medical; Neurological; Children; Allergy; Skin; Psychiatric; Surgical; Fracture; Gynecological; Ear, Nose, and Throat; Eye; Genito-urinary; X-ray; Physical Medicine; Dental.

Applications for appointment to any of these posts should be sent on or before Monday, 16th October, 1944, to—

J. C. BURDETT, Director and House Governor.

22nd September, 1944.

KING EDWARD MEMORIAL HOSPITAL, Ealing, W.13. Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), vacant the 29th October, 1944. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary at the rate of £350 p.a., with full residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating age, nationality, qualifications with dates, experience and details of previous appointments, and accompanied by copies of 2 recent testimonials, should be sent immediately to: R. A. MICKELWRIGHT, House Governor.

CONNAUGHT HOSPITAL, Walthamstow, E.17. Applications are invited from registered medical practitioners, Male and Female, for the appointment of CASUALTY OFFICER (A), vacant 1st October, 1944. Salary at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

Applications to be sent as soon as possible to—

R. HALTON HARRISON, Secretary.

COUNTY BOROUGH OF EAST HAM. Applications are invited from duly qualified persons for the appointment of TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH (Man or Woman) at a salary of £500, rising annually by £50 to a maximum of £700 p.a., plus war bonus in accordance with the Council's scale for official staff from time to time, at present £33 16s. p.a.

A salary above the commencing salary may be paid according to the experience of the candidate appointed. The age limit is 45 years.

The appointment will be subject to the approval of the Ministry of Health, the provisions of the Local Government Act, 1937, and to the Council's conditions of service applicable to the post in force from time to time.

The successful candidate will be required to act under the direction of the Medical Officer of Health, to undertake primarily duties in connexion with maternity and child welfare and the Aldersbrook Children's and Scattered Homes, together with such other work as may be allocated by the Medical Officer of Health from time to time.

The person appointed must devote whole-time service to the duties of the office, not engage in private practice, and must reside within the County Borough or in the vicinity of the Aldersbrook Children's Homes, Wanstead. The successful applicant will be required to pass a medical examination.

Persons of military age must obtain the permission of the Ministry of Health to apply for this position under the terms of the Ministry of Health Circular 2818 dated 26th May, 1943.

The appointment will be subject to 1 month's notice on either side.

Forms of application can be obtained from the undersigned and must be returned, together with copies of 3 recent testimonials and endorsed "Assistant Medical Officer," not later than the 12th October, 1944.

Canvassing in any form will disqualify.

C. V. THORNLEY, Town Clerk.

Town Hall, East Ham, E.6, September, 1944.

THE SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from registered medical Female practitioners for the undermentioned appointment, vacant 1st November: HOUSE SURGEON (A). The appointment will be for a period of 6 months. Salary is at the rate of £100 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply.

Applications, stating age, nationality, qualifications with dates, and accompanied by copies of 3 recent testimonials, should be sent to the Secretary at the hospital by Saturday, 14th October, 1944.

THE SALVATION ARMY. The Mothers' Hospital, Clapton, E.5. Applications are invited from medical Women for the post of JUNIOR RESIDENT MEDICAL OFFICER (B2), vacant 1st November. Salary £110 p.a., with board, residence, and laundry. The appointment is for 6 months. W practitioners who now hold A posts may also apply.

Applications, with testimonials, to be sent to the Secretary-Superintendent not later than 9th October.

THE SALVATION ARMY. The Mothers' Hospital, Clapton, E.5. Applications are invited from medical Women for the post of SENIOR RESIDENT MEDICAL OFFICER (B2), vacant 1st November. Salary £150 p.a., with board, residence, and laundry. The appointment is for 6 months. W practitioners holding A posts may apply.

Applications, with testimonials, to be sent to the Secretary-Superintendent not later than 9th October.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. Applications are invited from registered medical practitioners (Male) for the appointments of HOUSE SURGEON (A) and HOUSE PHYSICIAN (A). Salary in each case is at the rate of £150 p.a., with full residential emoluments. Appointments will be for a period of 6 months. Practitioners within 3 months of qualification and liable under National Service Acts may apply.

Applications should be addressed to—

FRANK JENNINGS, House Governor and Secretary.

EAST HAM MEMORIAL HOSPITAL, Shrewsbury-road, E.7. (131 Beds.) Applications are invited from registered medical practitioners (Male and Female) for the appointment of HOUSE PHYSICIAN (B2), vacant 5th November next. Salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply; when appointment will be limited to 6 months.

Applications, stating full particulars, accompanied by copies of 3 recent testimonials, should be forwarded not later than 12th October to: REGINALD PERRY, Secretary-Superintendent.

EAST HAM MEMORIAL HOSPITAL, Shrewsbury-road, E.7. (131 Beds.) Applications are invited from registered medical practitioners (Male and Female) for the appointment of HOUSE SURGEON AND CASUALTY OFFICER (A), vacant 1st November next. Salary at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, with copies of 3 recent testimonials, should be forwarded not later than 12th October to—

REGINALD PERRY, Secretary-Superintendent.

LONDON COUNTY COUNCIL. Medical practitioners required for the undermentioned positions :—

(1) TEMPORARY ASSISTANT MEDICAL OFFICER, Class I (B1). Salary £350 a year, rising by £25 a year to £425 a year, plus temporary cost-of-living bonus.

Hospital	*Duties*
St. Olave's Hospital, Lower-road, Rotherhithe, S.E.16.	Mainly anæsthetics.
Mile End Hospital, Bancroft-road, Mile End, E.1.	Surgical.
St. Peter's Hospital, Fulbourne-street, Whitechapel, E.1.	General medical (chronic sick).
Queen Mary's Hospital for Children, Carshalton, Surrey.	Experience in children's diseases desirable.

Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

(2) TEMPORARY ASSISTANT MEDICAL OFFICER, Class II (B2). Salary £250 a year, plus temporary cost-of-living bonus.

Hospital	*Duties*
St. Stephen's Hospital, 369, Fulham-road, S.W.10.	Fractures and casualty.
Hackney Hospital, High-street, Homerton, E.9.	Medical Officer.
Dulwich Hospital, East Dulwich-grove, S.E.22.	Anæsthetics.
St. Giles' Hospital, St. Giles'-road, Camberwell, S.E.5 (2 vacancies).	(*a*) Medical and anæsthetics. (*b*) Medical.
St. Mary, Islington, Hospital, Highgate Hill, N.19.	Obstetrics.
Grove Park Hospital, Lee, S.E.12 (temporarily evacuated).	Experience in tuberculosis desirable.
Queen Mary's Hospital for Children, Carshalton, Surrey (2 vacancies).	(*a*) Medical. (*b*) Surgical.
Lambeth Hospital, Brook-drive, Kennington-road, S.E.11.	General medical.
Mile End Hospital, Bancroft-road, E.1.	General medical.

Infectious Hospitals Service : Persons appointed to the Infectious Hospitals Service are eligible for promotion to Class I (B1) (temporary rank) in that service after a minimum period of 6 months.

R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months.

The above positions are with board, lodging, and washing. Married quarters are not available.

Application forms obtainable (stamped addressed foolscap envelope required) from the Medical Officer of Health (S.D.2), The County Hall, S.E.1, returnable by 9th October, 1944. Canvassing disqualifies.

LONDON COUNTY COUNCIL. Applications are invited from registered medical practitioners for TEMPORARY DEPUTY MEDICAL SUPERINTENDENT (Class IV) (B1) at Colindale Hospital, The Hyde, N.W.9. Experience in pulmonary tuberculosis essential. Salary £500–£25–£600 a year, plus temporary cost-of-living bonus, and board and lodging and washing. Married quarters are not available. Applications from R and W practitioners now holding B1 posts cannot be considered unless they have been rejected by the R.A.M.C.

Application form obtainable (stamped addressed foolscap envelope necessary) from the Medical Officer of Health (S.D.2), County Hall, S.E.1, returnable by 16th October, 1944.

Canvassing disqualifies.

ST. GEORGE'S HOSPITAL, Hyde Park Corner, S.W.1. Applications are invited for the temporary appointment of CLINICAL PATHOLOGIST (part-time, non-resident). The appointment will be for a period of 6 months in the first place and salary will be at the rate of £300 p.a.

Applications to be sent immediately to the Secretary.

BRITISH POSTGRADUATE MEDICAL SCHOOL. (University of LONDON.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of CASUALTY OFFICER (B2). The salary is at the rate of £200 p.a., plus 19s. per week war bonus. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months.

Application to be made to the Dean, British Postgraduate Medical School, Ducane-road, London, W.12, not later than 20th October, 1944.

THE BOLINGBROKE HOSPITAL, Wandsworth Common, London, S.W.11. Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON (A), vacant 24th October. The normal period of the appointment is 6 months. Salary is at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, nationality, qualifications, and experience, accompanied by copies of 3 recent testimonials, should be sent as soon as possible to—

W. S. RANDOLPH BISS, Secretary-Superintendent.

UNIVERSITY COLLEGE HOSPITAL. Radio-Therapy Department. Applications are invited for the appointment of HARKER SMITH REGISTRAR in the Department of Radiotherapy. The appointment is part-time at a salary of £300 p.a., non-resident. The duties in connexion with this appointment may be obtained on application to the Secretary.

Applications, with qualifications and copies of 3 testimonials, to the Secretary, University College Hospital, Gower-street, W.C.1, not later than 14th October, 1944.

WOOLWICH MEMORIAL HOSPITAL, Shooters Hill, London, S.E.18. CLINICAL ASSISTANTS required : (*a*) Wednesday mornings, and (*b*) Friday afternoons, to assist Dr. Bruce Pearson. Honorarium 1 guinea per session.

Applications, for one or both sessions, should be addressed to the Honorary Secretary, Medical Committee, at the Hospital.

THE PRINCESS BEATRICE HOSPITAL, Earl's Court, S.W.5. (General Hospital—88 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), vacant 1st November, 1944. Salary is at the rate of £130 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of not more than 3 testimonials, should be sent immediately to—

G. PURSSELL, Acting House Governor.

THE SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from registered medical Female practitioners for the appointment of RESIDENT MEDICAL OFFICER (B1), with care of the Obstetric Department. Some gynæcological beds, out-patient clinics, and administrative work, from 1st November, or before. Applicants should have held house appointments. Minimum salary at the rate of £150 a year, with full residential emoluments. Suitably qualified W practitioners holding B2 appointments, also those now holding B1 posts and have been rejected by the R.A.M.C., may apply.

Applications, stating age, nationality, qualifications with dates, and accompanied by copies of 3 recent testimonials, should be sent to the Secretary as soon as possible.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. Applications are invited from Male registered practitioners for the appointment of HOUSE PHYSICIAN (B2), vacant 1st November. Salary is at the rate of £200 p.a., with full residential emoluments. R practitioners who now hold A posts may apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications with dates, and previous experience, together with 3 recent testimonials, to be sent to : F. A. LYON, Administrator and Secretary.

Seamen's Hospital Society, Greenwich, S.E.10.

PUTNEY HOSPITAL. Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE PHYSICIAN (A), vacant 15th October, 1944. The appointment will be for a period of 6 months. Salary is at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Apply to the Secretary.

MIDDLESEX COUNTY COUNCIL. Resident Junior Assistant MEDICAL OFFICER (B2) for *medical* duties required at Hillingdon County Hospital, near Uxbridge, Middlesex. Applications invited from registered medical practitioners, including R practitioners who now hold A posts. Salary £250 p.a., plus cost-of-living bonus. Board, lodging, and laundry. Whole-time duties, such as Council may require, under supervision of Medical Director. Appointment is for 6 months, but may be extended for further 6 months (except in case of R practitioners). Post vacant 1st November.

Applications, stating age, nationality, qualifications, present post and previous experience, enclosing copies of not more than 3 recent testimonials, to the Medical Director, "B3," of Hospital. Application forms not provided. Closing date 20th October, 1944. C. W. RADCLIFFE, Clerk of the County Council.

Middlesex Guildhall, Westminster, S.W.1.

MIDDLESEX COUNTY COUNCIL. Resident Junior Assistant MEDICAL OFFICER (B2) for *surgical* duties, required at Hillingdon County Hospital, near Uxbridge, Middlesex. Applications invited from registered medical practitioners, including R practitioners who now hold A posts. Salary £250 p.a., plus cost-of-living bonus. Board, lodging, and laundry. Whole-time duties, such as Council may require, under supervision of Medical Director. Appointment is for 6 months, but may be extended for further 6 months (except in case of R practitioners). Post vacant 11th December, 1944.

Applications, stating age, nationality, qualifications, present post and previous experience, enclosing copies of not more than 3 recent testimonials, to the Medical Director, "B3," of Hospital. Application forms not provided. Closing date 20th October, 1944. C. W. RADCLIFFE, Clerk of the County Council.

Middlesex Guildhall, Westminster, S.W.1.

KING GEORGE HOSPITAL, Ilford. Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of HOUSE SURGEON (A), vacant 1st November, 1944. The appointment will be for a period of 6 months. Salary is at the rate of £120 p.a., with full residential emoluments.

Applications, with testimonials, should be sent as soon as possible to : G. AUSTIN HEPWORTH, Secretary and Superintendent.

SWANSEA GENERAL AND EYE HOSPITAL. Applications are invited from registered medical practitioners, Male and Female, for the appointments of HOUSE SURGEONS (A), one post now vacant and the other to become vacant on the 1st November. Salary is at the rate of £165 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointments will be for a period of 6 months.

Applications should be forwarded to—

O. C. HOWELLS, Secretary-Superintendent.

THE ROYAL LIVERPOOL UNITED HOSPITAL. Liverpool ROYAL INFIRMARY. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A) to the Gynæcological Department, duties to commence immediately. Salary is at the rate of £70 p.a., with board and residence. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating full particulars, should be sent to—

A. V. J. HINDS, Secretary.

The Royal Liverpool United Hospital,
66, Rodney-street, Liverpool, 1.

HIS MAJESTY'S COLONIAL SERVICE

THE COLONIAL MEDICAL SERVICE

VACANCIES FOR MEDICAL OFFICERS

The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.

The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable in the United Kingdom who are British subjects and who are under thirty-five years of age.

Medical Officers are appointed in the first instance for general service. But there are ample opportunities for work in special branches of medicine and surgery, in public health and in medical research.

The normal salary scale is from £600 to between £1,000 and £1,120. There are large numbers of super-scale posts to which promotion is made on merit and which carry higher salaries.

Government quarters, in many cases free of rent, and first-class passages to and from the Colonies are provided, and an adequate pension scheme is in force.

Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.

Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 2, Park-street, London, W.1.

CITY OF LIVERPOOL. Smithdown Road Hospital, Liverpool, 15. (1020 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ASSISTANT MEDICAL OFFICERS (B2). The salary is at the rate of £200 p.a., with full residential emoluments. All fees received in connexion with the appointment to be handed over to the City Council. The appointment will be made in accordance with the Standing Orders of the City Council. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months; otherwise for 12 months.

Applications, stating whether R or W practitioner, age, nationality, qualifications with dates, experience and details of previous appointments, and accompanied by copies of 3 recent testimonials, should be endorsed "Resident Medical Officer" and sent forthwith to: W. H. BAINES, Town Clerk.

Municipal Buildings, Dale-street, Liverpool, 2,
September, 1944.

CITY OF LIVERPOOL. Fazakerley Sanatorium. (470 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ASSISTANT MEDICAL OFFICER (B2). The above Sanatorium is for the treatment of pulmonary and non-pulmonary tuberculosis. The salary is at the rate of £350 p.a., with full residential allowances. All fees received in connexion with the appointment to be handed over to the City Council. The appointment will be made in accordance with the Standing Orders of the City Council and will be determinable by 1 month's notice on either side. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months; otherwise for 12 months.

Applications, stating whether R or W practitioner, age, nationality, qualifications with dates, experience and details of previous appointments, and accompanied by 3 recent testimonials, should be endorsed "Resident Medical Officer" and sent forthwith to: W. H. BAINES, Town Clerk.

Municipal Buildings, Dale-street, Liverpool, 2,
September, 1944.

CITY OF MANCHESTER. Booth Hall General Hospital for CHILDREN. (760 Beds.) Applications are invited from registered medical practitioners, Male or Female, for the appointment of RESIDENT ASSISTANT MEDICAL OFFICER (A), vacant 12th November, 1944. The duties of the post are mainly medical. The basic salary for the appointment is £200 p.a., with board, residence, and laundry in addition, subject to the Manchester Corporation conditions of service. A temporary cost-of-living wages addition is payable in addition to the salary stated. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months; otherwise for 12 months.

Applications, stating the full name, age (giving date of birth), nationality, professional qualifications (with dates), particulars of present and past hospital appointments, are to be addressed to the Medical Superintendent, Booth Hall Hospital, Charlestown-road, Blackley, Manchester, 9, and are to be received by him not later than 18th October, 1944. Canvassing in any form is prohibited. R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 21st September, 1944.

THE CHILDREN'S HOSPITAL, King Edward VII Memorial, BIRMINGHAM, 16. Applications are invited from registered medical practitioners for the appointment of ASSISTANT CASUALTY OFFICER (B2), vacant 15th January, 1945. Applicants must have had surgical experience. The salary is at the rate of £200 p.a., with board, residence, and laundry, and the appointment is tenable for 6 months. R and W practitioners holding A posts may also apply.

Applications, stating age, nationality, qualifications with dates, and details of previous appointments, should be sent by 4th November, 1944, to— HAROLD F. SHRIMPTON,
19th September, 1944. House Governor.

ROYAL SALOP INFIRMARY, Shrewsbury. Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of HOUSE SURGEON (A), vacant 9th October. The appointment will be for a period of 6 months. Salary is at the rate of £160 p.a., with full residential emoluments.

J. P. MALLETT, Secretary-Superintendent.
Board Room, 19th September, 1944.

BOROUGH OF ACCRINGTON. Applications are invited from registered medical practitioners of either sex for the post of ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER to the Borough of Accrington. The post is normally a permanent one, but in accordance with the desires of the Ministry of Health the proposed appointment will be, in the first place, temporary. The person appointed will be eligible to apply for the permanent post at a later date. The holder of the post will have the status of Deputy to the Medical Officer of Health and School Medical Officer and will be expected to undertake administrative as well as clinical duties. The possession of a Diploma in Public Health is not essential, but will be an advantage. The salary will be at the rate of £600, rising by annual increments of £25 to a maximum of £700, together with the appropriate rate of cost-of-living bonus which may from time to time apply. The person appointed will be required to pass a medical examination and to contribute to the Council's Superannuation Scheme. Applicants of military age who are in Local Authority employment must obtain the consent of the Minister of Health before applying.

Application should be made on the appropriate form which may be obtained from the undersigned, together with full particulars of the terms and conditions of the post. The completed form, accompanied by copies of not more than 3 recent testimonials, should be returned not later than Wednesday, 18th October, 1944.

Town Hall, Accrington. P. D. WADSWORTH, Town Clerk.

SWANSEA GENERAL AND EYE HOSPITAL. Applications are invited from registered medical practitioners for the temporary appointment of RADIOTHERAPIST (who will also be required to assist in radiodiagnostic work). Salary £850 p.a., non-resident. Applicants must hold a Diploma in Radiotherapy and Radiodiagnosis. The successful candidate will be required to devote whole time to the service of the Hospital and will have the right to treat private patients in the Hospital by arrangement, on terms to be agreed with the Board, but will not be permitted to undertake private practice outside the Hospital. The Hospital will function as an approved Sub-Centre of the Institute of Radiotherapy under the Cancer Act.

Applications, stating age, qualifications, nationality, and full particulars of previous appointments held, to be forwarded to—
O. C. HOWELLS, Secretary-Superintendent.

GRIMSBY AND DISTRICT GENERAL HOSPITAL. (237 Beds, 1A.) Applications are invited from registered medical practitioners, Male and Female, for the following appointments:—

RESIDENT ORTHOPÆDIC OFFICER (B2). Appointment for 6 months. The salary is at the rate of £275 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply.

HOUSE PHYSICIAN (A). Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for 6 months.

Applications immediately, stating age, nationality, qualifications, and copies of recent testimonials, to the Secretary-Superintendent.

NUNEATON EMERGENCY HOSPITAL. County of Warwick. Applications are invited from registered practitioners, Male and Female, for the appointment of SURGICAL REGISTRAR (B1) at the above Hospital, vacant shortly. Applicants should have held house appointments and preference will be given to Fellows of one of the Royal Colleges of Surgeons. Salary £450 p.a. (£500 if F.R.C.S.), plus cost-of-living bonus, together with the usual residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners now holding B1 and rejected by the R.A.M.C., may apply.

Applications on forms to be obtained from the Public Assistance Officer, Shire Hall, Warwick, should, on completion, be returned to him not later than the 13th October, 1944.

JENNY LIND HOSPITAL FOR CHILDREN, Norwich. Applica- tions are invited for the appointment of RESIDENT MEDICAL OFFICER (B2) from registered medical practitioners, Male and Female. The appointment will be for 6 months. Salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners now holding A posts may apply.

Applications, together with copies of testimonials, should be sent not later than Monday, 16th October, 1944, to—
FRANK INCH, Secretary.

CITY AND COUNTY OF NEWCASTLE UPON TYNE. City HOSPITAL FOR INFECTIOUS DISEASES. Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of RESIDENT MEDICAL ASSISTANT (A), now vacant. The appointment is tenable for a period of 6 months and the salary is at the rate of £250 p.a., with full residential emoluments.

Applications, stating age, qualifications, and nationality, should be forwarded immediately to the Medical Officer of Health, Town Hall, Newcastle upon Tyne, 1.

CITY AND COUNTY OF NEWCASTLE UPON TYNE. City HOSPITAL FOR INFECTIOUS DISEASES. (338 Beds.) Applications are invited from registered medical practitioners for the appointment of TEMPORARY MEDICAL SUPERINTENDENT. Salary £950 p.a., together with residential emoluments valued at £100 p.a., and cost-of-living bonus. The appointment is terminable by 1 month's notice on either side and is subject to the provisions of the Local Government Superannuation Act, 1937. The successful applicant will be required to pass the necessary medical examination. Candidates should submit with their applications full information as to liability for military service, medical fitness, and position as regards deferment.

Applications, stating age, nationality, qualifications, and experience, and accompanied by copies of 2 recent testimonials, should be forwarded to the Medical Officer of Health, Town Hall, Newcastle upon Tyne, 1, not later than 14th October, 1944.

MACCLESFIELD GENERAL INFIRMARY. (100 Beds—2 Residents.) Applications are invited from registered medical practitioners, Male and Female, for the following appointments:—

SENIOR HOUSE SURGEON (B2), to commence on 16th October, 1944. Salary £200 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply.

JUNIOR HOUSE SURGEON (A), to commence as soon as possible after 1st October, 1944. Salary £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Appointments will be for 6 months.

Applications to Superintendent, General Infirmary, Macclesfield.

THE RADCLIFFE INFIRMARY, Oxford. Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the following posts, vacant 1st November, 1944:—

(1) HOUSE SURGEON (A).

(2) GYNÆCOLOGICAL HOUSE SURGEON (A).

The appointments will be for a period of 6 months. The salary in each case is at the rate of £100 p.a., with full residential emoluments.

Applications, stating qualifications with dates, age, nationality, and present post, with copies of 3 testimonials, must be sent not later than Friday, 6th October, 1944, to—

A. G. E. SANCTUARY, Administrator.

THE RADCLIFFE INFIRMARY, Oxford. Applications are invited from registered medical practitioners, Male and Female, including R and W practitioners who now hold A posts, for the following appointments, vacant 1st November, 1944:—

(1) OBSTETRIC HOUSE PHYSICIAN (B2).

(2) RESIDENT MEDICAL OFFICER (B2) to that section of the Infirmary, consisting of 87 Beds and dealing with the diagnosis and treatment of tuberculosis, known as the Osler Pavilion, Headington, Oxford.

Each appointment will be for a period of 6 months. The salary of the Obstetric House Physician will be at the rate of £100 p.a., with full residential emoluments, and that of Resident Medical Officer at the Osler Pavilion will be at the rate of £120 p.a., with full residential emoluments.

Applications, stating qualifications with dates, age, nationality, and present post, with copies of 3 testimonials, must be sent not later than Friday, 6th October, 1944, to—

A. G. E. SANCTUARY, Administrator.

GLOUCESTERSHIRE COUNTY COUNCIL. Applications are invited for the appointment of TEMPORARY DEPUTY COUNTY MEDICAL OFFICER OF HEALTH (Male) at a salary of £750 p.a., rising by annual increments of £50 to a maximum of £900 p.a. Travelling and subsistence allowances will be paid in accordance with the County scale.

Applicants must be registered medical practitioners, holding a Diploma in Public Health, and have experience in general public health duties and in the administrative work of a public health department.

The selected candidate will be required to undergo a medical examination.

Forms of application, with particulars of the duties and conditions of appointment, may be obtained from the County Medical Officer of Health, Langham House, Berkeley-street, Gloucester, to whom completed applications, with copies of 3 recent testimonials, should be sent not later than the 23rd October, 1944.

Canvassing, directly or indirectly, will be a disqualification.

GUY H. DAVIS, Clerk of the County Council.

Shire Hall, Gloucester.

EAST SUFFOLK AND IPSWICH HOSPITAL, Ipswich. (400 Beds.) Applications are invited from registered medical practitioners for the following posts:—

HOUSE PHYSICIAN (B2), vacant 1st November, 1944.

HOUSE SURGEON (B2) to the Senior Surgeon, vacant now.

R practitioners who now hold A posts may apply.

HOUSE SURGEON (A), vacant 1st November. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Appointments will be for 6 months in each case, and the salary is at the rate of £175 p.a., with full residential emoluments.

ARTHUR GRIFFITHS, Secretary.

The Hospital, Ipswich, 30th September, 1944.

SURREY COUNTY COUNCIL. Surrey County Sanatorium, MILFORD, near GODALMING. (348 Beds.) Applications are invited for the appointment of DEPUTY MEDICAL SUPERINTENDENT (B1). Treatment at the Sanatorium is afforded to both sexes and there is a Thoracic Surgical Unit under the charge of 2 visiting surgeons and a resident surgeon. Candidates must possess wide experience in the diagnosis and treatment of pulmonary tuberculosis by modern methods. Unfurnished house (rent of £80 p.a.) is provided. The appointment is available for the further duration of the war and is subject to 1 month's notice on either side, but any Local Government Superannuation rights will be preserved. At the end of the war the appointment will be readvertised. Salary at the rate of £800 p.a., plus allowance of £50 p.a. for administrative duties, plus £125 p.a. in lieu of emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners now holding B1 and have been rejected by the R.A.M.C., may apply.

Apply to the County Medical Officer, County Hall, Kingston-on-Thames, by the 11th October, 1944.

SURREY COUNTY COUNCIL. Kingston County Hospital. (500 Beds.) Applications are invited for the appointment of MEDICAL SUPERINTENDENT. Candidates must have had considerable experience in hospital administration. The Medical Superintendent will also be required to act as Medical Officer of the adjoining Public Assistance Institution, where a further 99 patients are accommodated in addition to the ordinary inmates. The appointment will be available for the further duration of the war, and is subject to 1 month's notice on either side, and will be readvertised after the end of the war, so that doctors now serving in the Forces may have the opportunity of applying. The commencing salary will be at a point on the grade £1100–£50–£1300 p.a., plus unfurnished rate-free house, valued for superannuation purposes at £100 p.a. Local Government Superannuation rights will be preserved.

Full applications, together with copies of 3 recent testimonials and details of any National Service obligations, should be forwarded to the County Medical Officer, County Hall, Kingston-on-Thames, by 27th October.

SURREY COUNTY COUNCIL. St. Helier County Hospital, CARSHALTON. (862 Beds.) Applications are invited from registered practitioners, Male and Female, for the appointment of JUNIOR OBSTETRIC MEDICAL OFFICER (B2). Salary is at the rate of £250 p.a., plus full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months; otherwise will not exceed 1 year.

Apply to the Medical Superintendent by the 10th October, 1944.

NORTHUMBERLAND COUNTY COUNCIL. Mona Taylor MATERNITY HOSPITAL, STANNINGTON. (20 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT OBSTETRIC OFFICER (B2). Applicants should have had previous resident experience in a maternity hospital, and preference will be given to candidates who have some knowledge of maternity and child welfare work. The officer appointed may be required to undertake attendance at a Child Welfare Centre and Antenatal Clinic in addition to hospital duties. Salary is at the rate of £350 p.a., plus war bonus, board, lodging, and laundry. The appointment is subject to medical examination. R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months; otherwise 1 year.

Applications, stating age, nationality, qualifications, and experience, and accompanied by copies of 2 recent testimonials, should be submitted as soon as possible to the undersigned, from whom further particulars may be obtained.

JOHN B. TILLEY, County Medical Officer.

County Hall, Newcastle-upon-Tyne, 1.

THE LADY CHICHESTER HOSPITAL (Incorp.), Aldrington HOUSE, NEW CHURCH-ROAD, HOVE. (54 Beds.) HOUSE PHYSICIAN (A) (Male or Female) required. Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Apply, with copies of testimonials, to the Secretary.

HERTFORDSHIRE COUNTY COUNCIL. Wellhouse Hospital BARNET. Applications are invited from registered medical practitioners, Male and Female, for the following appointments:—

2 HOUSE SURGEONS (A) and RESIDENT ANÆSTHETIST (A), vacant now. Salary is at the rate of £150 p.a., with full residential emoluments.

CASUALTY OFFICER (B2). Salary £200 p.a., with full residential emoluments.

For the B2 post, R and W practitioners now holding A posts may apply. For the A post, practitioners within 3 months of qualification and liable under the National Service Acts may apply. The appointments will be for 6 months.

Applications to the Medical Superintendent at once.

BROMLEY AND DISTRICT HOSPITAL, Bromley, Kent. Applications are invited for the post of HOUSE SURGEON (A), Male, duties to commence immediately. Salary £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications should be addressed to the Secretary as soon as possible.

BIRMINGHAM ACCIDENT HOSPITAL AND REHABILITATION CENTRE. Applications are invited from registered medical practitioners, Male and Female, including R and W practitioners who now hold A posts, for the appointment of HOUSE SURGEON (B2), vacant immediately. The appointment will be for 6 months. The salary is at the rate of £150 p.a., with full residential emoluments.

A. A. MACIVER, Secretary.

Bath-row, Birmingham, 15, 18th September, 1944.

COUNTY COUNCIL OF ESSEX AND URBAN DISTRICT COUNCIL OF THURROCK. COMBINED MEDICAL SERVICE. Applications are invited from duly qualified medical practitioners, possessing the Diploma in Public Health and having special experience in obstetrics, for the vacant joint appointment of TEMPORARY ASSISTANT COUNTY MEDICAL OFFICER AND TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH.

The salary attaching to the appointment will be at the rate of £500 a year, together with war bonus, rising, subject to satisfactory service, by annual increments of £25 to £700 a year, but the commencing salary may be varied having regard to experience and capabilities.

Forms of application may be obtained from the Clerk of the County Council, to whom they should be returned completed, accompanied by copies of 3 recent testimonials, not later than 10th October, 1944.

Canvassing, whether directly or indirectly, is forbidden.

JOHN E. LIGHTBURN,
Clerk of the County Council.
A. E. POOLE,
Clerk to the Urban District Council of Thurrock.

County Hall, Chelmsford, 12th September, 1944.

COVENTRY AND WARWICKSHIRE HOSPITAL. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A). The post, which is for 6 months, is vacant immediately. Salary at the rate of £170 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be addressed immediately to—

S. CECIL HILL, House Governor and Secretary.

COVENTRY AND WARWICKSHIRE HOSPITAL, Coventry. The present holder of the post having suddenly been recalled for his country's service, applications are invited for the appointment of RESIDENT SURGICAL OFFICER (B1). Commencing salary £500 p.a., with full residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating full details of qualifications and experience, &c., should be sent immediately to the House Governor.

ROYAL INFIRMARY, Preston. Applications are invited from registered medical practitioners (including practitioners within 3 months of qualification and liable under the National Service Acts) for the following posts :—

HOUSE SURGEON (A) to Consulting Surgeon (recognised for the F.R.C.S. examination).

HOUSE SURGEON (A) to Ophthalmic and Aural Departments with some duties in medical wards (recognised for the D.O.M.S. and D.L.O. examinations).

Salary in each case at the rate of £150 p.a., with full residential emoluments. 6 months' appointment.

Applications, with full details, to be sent to the Superintendent.

ROYAL INFIRMARY, Preston. Applications are invited for the temporary post of CONSULTANT OBSTETRICAL OFFICER (during the absence on military service of the permanent holder) for the Joint Scheme of Maternity Services. Duties—at the maternity hospitals belonging to the Infirmary, and the Preston Corporation, and also the antenatal clinics of the Lancashire County Council—to commence 1st October next. Candidates should hold a postgraduate degree in obstetrics. Salary at the rate of £1000 a year, plus travelling expenses.

Applications, stating age, qualifications, and experience, accompanied by copies of 3 testimonials, to be forwarded immediately to : JOHN GIBSON, Superintendent and Secretary, at the Royal Infirmary, Preston.

COUNTY BOROUGH OF MIDDLESBROUGH. Public Health DEPARTMENT. HEMLINGTON EMERGENCY HOSPITAL. Applications are invited from registered medical practitioners for the appointment of ASSISTANT RESIDENT MEDICAL OFFICER (B2) at the above Hospital (480 Beds). Good experience is afforded in both medical and surgical work. The salary is at the rate of £200 p.a., together with full residential emoluments. The successful candidate will be required to pass satisfactorily a medical examination. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months ; otherwise for a period of 12 months.

Applications to be sent to the Medical Officer of Health, Public Health Department, Municipal Buildings, Middlesbrough, not later than Tuesday, 3rd October, 1944.

PRESTON KITCHEN, Town Clerk.

Municipal Buildings, Middlesbrough, 12th September, 1944.

COUNTY BOROUGH OF DEWSBURY. The Council, with approval of the Minister of Health, invite applications from registered medical practitioners holding a Diploma in Public Health for the vacancy of TEMPORARY DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY SCHOOL MEDICAL OFFICER. Salary £700, plus bonus (Male £49 8s., female £40 6s.).

Terms and conditions of the appointment, together with application form, may be obtained from the Medical Officer of Health, Municipal Buildings, Halifax-road, Dewsbury, to whom applications, accompanied by copies of 3 recent testimonials, should be delivered as soon as possible. The appointment will be subject to the approval of the Minister of Health and the provisions of the Local Government Superannuation Act, 1937. It will be terminated by 3 months' notice on either side. The person appointed will be required to reside in the County Borough. HOLLAND BOOTH, Town Clerk.

VICTORIA HOSPITAL, Burnley. (169 Beds.) Applications are invited from registered medical practitioners for the appointment of 2 HOUSE SURGEONS (A). Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of 6 months.

Applications should be sent to : J. E. WHEATCROFT, Secretary.

ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL. (255 Beds.) Applications are invited from registered medical practitioners, Male and Female, including R and W practitioners who now hold A posts, for the appointment of HOUSE SURGEON (B2), vacant 29th October, 1944. The appointment will be for a period of 6 months. The salary is at the rate of £175 p.a., with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

EDWARD L. WIRGMAN, House Governor and Secretary.

ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL. (255 Beds.) Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of CASUALTY OFFICER (A). The appointment will be for a period of 6 months. Salary is at the rate of £175 p.a., with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

EDWARD L. WIRGMAN, House Governor and Secretary.

PONTEFRACT GENERAL INFIRMARY AND THE HYDES HOSPITAL. (112 Beds.) Applications are invited from registered medical practitioners (Male) for the appointment of HOUSE SURGEON (A), vacant immediately. Salary £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications should be sent to— D. J. RICHARDS,
11th September, 1944. Secretary-Superintendent.

KEWSTOKE EMERGENCY HOSPITAL, Weston-super-Mare. Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (A). Commencing salary £200 p.a., with full board and residence. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to the Medical Superintendent.

EXMINSTER HOSPITAL, Devon. Applications are invited from registered medical practitioners, Male and Female, for the following appointment. It is desirable that candidates should be interested in Orthopædic work, as Exminster Hospital is a Fracture A Hospital and has 220 fracture and orthopædic Beds :—

RESIDENT HOUSE SURGEON (B2). The salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months, otherwise can be for a period of 1 year.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent as soon as possible to the Medical Superintendent, Exminster Hospital, Exminster, near Exeter, Devon.

BURY INFIRMARY, Lancs. (159 Beds.) Applications are invited from registered medical practitioners (Male and Female) for the appointment of CASUALTY AND SPECIALS HOUSE SURGEON (A), now vacant. Salary is at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for 6 months ; otherwise renewable.

Applications, giving full particulars, immediately to—

H. WILKINSON, Superintendent.

THE HOLY CROSS SANATORIUM, Haslemere, Surrey. (143 Beds, including private patients.) ASSISTANT RESIDENT MEDICAL OFFICER (B2), Female, required immediately. Experience in tuberculosis desirable. Salary £250 p.a., with full residential emoluments.

Applications, with copies of testimonials, should be sent to the Medical Superintendent immediately.

GRIMSBY AND DISTRICT GENERAL HOSPITAL. (237 Beds). Applications are invited from registered medical practitioners, Male or Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the post of RESIDENT CASUALTY OFFICER AND HOUSE SURGEON (A). Appointment for 6 months. Salary at the rate of £175 p.a., with full residential emoluments.

Applications, stating age, nationality, qualifications, and copies of recent testimonials, to the Secretary-Superintendent.

NEWARK TOWN AND DISTRICT HOSPITAL. (70 Normal Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), now vacant. Salary is at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply. Appointment will be for a period of 6 months.

B. C. DION, Secretary-Superintendent.

THE BOLTON ROYAL INFIRMARY. (270 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (B2), vacant 11th October, 1944. Salary £200 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months.

Applications, stating age, nationality, and experience, together with copies of testimonials, to be forwarded to—

JOSEPH GRIFFITH, Superintendent-Secretary.

NORTH STAFFORDSHIRE ROYAL INFIRMARY, Stoke-on-TRENT. Applications are invited from registered medical practitioners for the appointment of ORTHOPÆDIC HOUSE SURGEON (A). Salary at the rate of £185 p.a., with full residential emoluments. The post offers exceptional experience in traumatic surgery. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for 6 months.

Applications to be forwarded as soon as possible to the House Governor.

COUNTY BOROUGH OF IPSWICH. Assistant Medical Officer OF HEALTH. Applications are invited from registered medical practitioners for the above whole-time temporary appointment, probably for the duration of the war. The possession of the Diploma in Public Health or an equivalent qualification will be an advantage. The salary scale is £600 p.a., rising by annual increments of £25 to £700, plus war bonus and travelling expenses. The successful candidate will be required to devote the whole of his or her time to the duties of the office, to assist generally as directed by the Medical Officer of Health in the administration of the various health services of the Council. The approval of the Minister of Health has been obtained for the appointment, and candidates should submit with their applications full information as to their liability for military service, medical fitness, and position as regards deferment.

Applications, accompanied by not more than 3 recent testimonials and endorsed "Assistant Medical Officer of Health," should be forwarded to the Medical Officer of Health, Elmstreet, Ipswich, at once.

Town Hall, Ipswich. A. MOFFAT, Town Clerk.

STRATFORD-ON-AVON EMERGENCY HOSPITAL. County of WARWICK. Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), vacant shortly. Applicants should have held house appointments and had surgical experience. Salary is at the rate of £300 p.a., with full residential emoluments. The appointment is limited to a period of 1 year. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners now holding B1 and have been rejected by the R.A.M.C., may apply.

Applications, on forms to be obtained from the Public Assistance Officer, Shire Hall, Warwick, should, on completion, be returned to him not later than the 13th October, 1944.

MANCHESTER ROYAL INFIRMARY. 2 House Surgeons (A) to Orthopædic Department. The Board of Management invite applications for the above posts, vacant shortly, from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts. The appointments are for 6 months at salaries at the rate of £75 p.a., with residence.

Applications, stating age, nationality, and qualifications, with 3 testimonials, should be sent to the Chairman of the Medical Board not later than 14th October, 1944.

By Order,
F. J. CABLE, General Superintendent and Secretary.
16th September, 1944.

THE ROBERT JONES AND AGNES HUNT ORTHOPÆDIC HOSPITAL, OSWESTRY. (540 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of ASSISTANT RESIDENT SURGICAL OFFICER (B1), vacant 30th September. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary is at the rate of £350 p.a., with full residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating age, nationality, qualifications, &c., with copies of recent testimonials, to be forwarded at once to the Secretary-Superintendent.

ROCHDALE INFIRMARY, Lancs. (110 Beds.) The Board of Management invites applications from registered medical practitioners for the appointment of SECOND HOUSE SURGEON (A). Salary £150, with full residential emoluments. The successful candidate must be a member of a Medical Defence Society. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to: W. WYNNE, Superintendent and Secretary.

LINCOLN COUNTY HOSPITAL. (Voluntary Hospital—200 Beds.) Applications are invited from registered medical practitioners, Male or Female, for the appointment of HOUSE PHYSICIAN (A), vacant 1st November, 1944. Salary is at the rate of £225 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when the appointment will be for 6 months.

ARTHUR MOORE, Secretary-Superintendent.
8th September, 1944.

THE ROYAL EYE AND EAR HOSPITAL, Bradford. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (B2). The salary is at the rate of £180 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months; otherwise may be extended.

Applications, stating age, qualifications, nationality, and copies of 3 recent testimonials, should be forwarded to—
ERNEST S. HEAP, Secretary-Superintendent.

MANSFIELD AND DISTRICT GENERAL HOSPITAL, Notts. (189 Beds and 89 E.M.S. Beds.) Applications are invited from registered medical practitioners for the appointments of HOUSE SURGEON (A) and HOUSE PHYSICIAN (A), both posts now vacant. Salary for each is at the rate of £220 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointments will be for a period of 6 months.

Applications should be sent immediately to—
K. L. WARD, Secretary.

VICTORIA HOSPITAL, Accrington. Applications are invited from medical practitioners (Male) for the appointment of HOUSE SURGEON (B2). The salary is at the rate of £200 p.a., with full residential emoluments. R practitioners who now hold A posts may apply, when the appointment will be limited to 6 months.

Apply, with copies of 2 testimonials, to Hon. Secretary.

NOTTINGHAM GENERAL HOSPITAL. (712 Beds, including E.M.S. Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), duties to commence on or about 1st November. Salary at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to be addressed to the undersigned, stating age, qualifications, experience, &c., together with copies of testimonials.
HENRY M. STANLEY,
House Governor and Secretary.

NOTTINGHAM GENERAL HOSPITAL. (712 Beds, including E.M.S. Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), duties to commence on or about 11th November. Salary at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to be addressed to the undersigned, stating age, qualifications, experience, &c., together with copies of testimonials.
HENRY M. STANLEY,
House Governor and Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners (Male and Female) for the appointment of RESIDENT CASUALTY OFFICER (A) for the above Hospital. Duties to commence on or about 23rd October, 1944. Salary at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—
HENRY M. STANLEY, House Governor and Secretary.

GENERAL HOSPITAL, Nottingham. Ear, Nose, and Throat Department (40 Beds) and large Out-patient Department. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A) for the above Department. Salary at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to be addressed to the undersigned, stating age, qualifications, experience, &c., together with copies of testimonials.
HENRY M. STANLEY,
16th August, 1944. House Governor and Secretary.

GENERAL HOSPITAL, Nottingham. (794 Beds, including E.M.S Beds.) SECOND PATHOLOGIST (whole time) required, experienced in histology and morbid anatomy. Temporary appointment with possibility of confirmation after the war. Commencing salary £900 p.a.

Apply, with copies of testimonials, giving details of experience and qualifications, to House Governor and Secretary, General Hospital, Nottingham.

WESTON-SUPER-MARE GENERAL HOSPITAL. (100 Beds.) Applications are invited from medical practitioners (Male and Female) for the appointment of HOUSE SURGEON (A), duties to commence immediately. Salary is at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be addressed to: LESLIE J. FURSLAND, Secretary.

CITY OF PORTSMOUTH. Saint Mary's Hospital. (1200 Beds.) Applications are invited from Male registered practitioners for the appointment of JUNIOR RESIDENT MEDICAL OFFICER (A). The salary is at the rate of £250 p.a., with residential emoluments valued at £150 p.a., and a temporary cost-of-living bonus at present payable at the rate of 9s. 6d. per week. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months; otherwise for a period of 12 months.

Application forms may be obtained from, and must be returned to, the Medical Officer of Health, Northern Secondary School, Mayfield-road, Portsmouth. FREDERICK SPARKS,
Municipal Offices, Royal Beach Hotel, Town Clerk.
Southsea, 11th September, 1944.

WINTERTON EMERGENCY HOSPITAL. (1060 Beds.) Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the following appointments, now vacant:—

HOUSE PHYSICIAN (A).
HOUSE SURGEONS (A).
HOUSE SURGEONS (A) to Fracture A Centre and Rehabilitation Unit.

Salaries at the rate of £120 p.a., with full residential emoluments. The appointments will be for a period of 6 months.

Applications should be forwarded to the Surgeon-in-Charge, Winterton Emergency Hospital, Sedgefield, Co. Durham.

NORTHAMPTON GENERAL HOSPITAL. (408 Beds.) Applications are invited immediately from registered medical practitioners, Male and Female, for the appointments of HOUSE PHYSICIAN (A), HOUSE SURGEON (A), and RESIDENT ANÆSTHETIST (B2). Salary for the A posts at rate of £160 p.a., and for the B2 post at rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply for the A posts, when appointments will be for a period of 6 months. R and W practitioners holding A posts may apply for the B2 post, when appointment will be limited to 6 months.

Applications should be sent as soon as possible to—
GORDON S. STURTRIDGE.

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ROYAL WEST SUSSEX HOSPITAL, Chichester. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER AND HOUSE SURGEON (A). Appointment is for 6 months from date of appointment. Salary £150 p.a., with residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, qualifications with dates, and nationality, supported by copies of 3 recent testimonials, should be sent to the House Governor and Secretary.

WREXHAM AND EAST DENBIGHSHIRE WAR MEMORIAL HOSPITAL, WREXHAM. Applications are invited from registered medical practitioners, Male and Female, for the following 6 months' appointments :—

2 RESIDENT HOUSE SURGEONS (A), to commence immediately. Salary at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

LESLIE SPENCER, Secretary.

THE ROBERT JONES AND AGNES HUNT ORTHOPÆDIC HOSPITAL, OSWESTRY. (540 Beds.) Applications are invited from registered medical practitioners, Male or Female, for the appointment of RESIDENT HOUSE SURGEON (B2), now vacant. Salary £200 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months.

Applications, stating age, nationality, qualifications, &c., with copies of testimonials, to be forwarded at once to—

JOHN C. MENZIES, Secretary-Superintendent.

BIRMINGHAM ACCIDENT HOSPITAL AND REHABILITATION CENTRE. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A) for Burns Unit, now vacant. Salary is at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

19th September, 1944. A. A. MACIVER, Secretary.

THE STAFFORDSHIRE GENERAL INFIRMARY, Stafford. Applications are invited from registered medical practitioners, Male and Female, for the following appointments :—

HOUSE SURGEON (A), vacant in October.

HOUSE PHYSICIAN (A), to commence duties on the 1st October. Salary in each case £196 p.a., with board-residence. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for 6 months.

Applications, with full particulars as to age and qualifications, accompanied by 3 recent testimonials, to be forwarded to the Secretary.

Stafford, 7th September, 1944.

COUNTY BOROUGH OF BOLTON. Townleys Hospital, FARNWORTH. Applications are invited from registered Male medical practitioners for the appointment of TEMPORARY ASSISTANT RESIDENT MEDICAL OFFICER (B1). An interest in obstetrics is desirable. The salary will be at the rate of £350 p.a., plus bonus, with emoluments valued at £130 p.a. Suitably qualified R practitioners holding B2 appointments, also those now holding B1 and rejected by the R.A.M.C., may apply.

Application forms, which may be obtained from the Medical Officer of Health, Public Health Department, Civic Centre, Bolton, to be completed and returned, together with copies of 2 recent testimonials, as soon as possible to—

PHILIP S. RENNISON, Town Clerk.

Town Hall, Bolton, 1st September, 1944.

DERBYSHIRE ROYAL INFIRMARY, Derby. (Voluntary Hospital —Total Beds 416, plus 230 E.M.S.) Applications are invited from registered medical practitioners (Male and Female) for the appointment of CASUALTY OFFICER (A), vacant 1st October. Salary is at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of 6 months.

Applications should be sent to—

ARTHUR TAYLOR, Superintendent and Secretary.

ROYAL UNITED HOSPITAL, Bath. Applications are invited for the post of ASSISTANT HONORARY GYNÆCOLOGIST AND OBSTETRICIAN which, in common with other appointments, will be temporary during the period of the war.

Applications, stating age, qualifications, and particulars of experience, together with 3 testimonials, should be addressed on or before the 12th October, 1944, to—

J. LAWRENCE MEARS, Secretary-Superintendent.

JOINT MANAGEMENT COMMITTEE FOR DYKEBAR ASYLUM. Applications are invited from registered medical practitioners for the temporary appointment of ASSISTANT MEDICAL OFFICER (B1) at Dykebar Mental Hospital. Suitably qualified R practitioners holding B2 or B1 appointments may apply, but they must have obtained the sanction of the Scottish Central Medical War Committee. Salary £500 p.a., plus war bonus, with board, lodging, and laundry at the Hospital.

Applications, stating age, nationality, qualifications, and experience, should be sent to the Medical Superintendent, Dykebar Mental Hospital, Paisley.

County Buildings, Paisley. ROBERT URQUHART, Clerk.

CITY OF LONDON MENTAL HOSPITAL, Stone, near Dartford, KENT. Wanted LOCUM TENENS at the above Hospital. Salary 10 guineas per week, plus residential emoluments.

Applications, stating age and qualifications, should be sent as soon as possible to the Medical Superintendent.

PENSIONS APPEAL TRIBUNALS.

MEDICAL MEMBERS.

Applications are invited from registered medical practitioners for appointment as medical members of the Pensions Appeal Tribunals for England and Wales. Remuneration at the rate of £800 p.a. inclusive. The tenure of office is indefinite and is normally terminable by 3 months' notice on either side. Members are required to devote the whole of their time to the service of the Tribunals and not to engage in any other professional activity during their tenure of office. The Tribunals sit in London and at the principal Provincial centres, and members must be prepared to sit wherever in England and Wales they are requested. A member required to travel away from the town which is adopted as his main centre for travelling purposes is entitled to a travelling allowance at first-class rates, and a subsistence allowance of £1 a night.

Applications should state the qualifications and experience of the applicant, and should be addressed to—

The Assistant Secretary,
Lord Chancellor's Office,
House of Lords, S.W.1.
(Envelopes should be marked "P.A.T.(M).")

Wanted immediately, Assistant in Town and Country Practice in Hertfordshire.—For further particulars apply to : No. 464, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Doctors, Male and Female, required for Locums and Assistantships. Vacancies for Hospital Locums and Ships' Surgeons. Practices and Partnerships for disposal.—Write : A. SHAW, Medical Transfer Agent, Premier Buildings, 88, Church-street, Liverpool.

Salaried Partner required in January. Provincial Non-panel Practice in Surrey. Own car. Furnished house provided. £1000 a year.—Address, No. 493, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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